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THE MUSSEL RESOURCES OF THE NORTH ATLANTIC REGION

PART I--THE SURVEY TO DISCOVER THE LOCATIONS AND AREAS OF THE NORTH ATLANTIC MUSSEL-PRODUCING BEDS

By Leslie W. Scattergood* and Clyde C. Taylor**

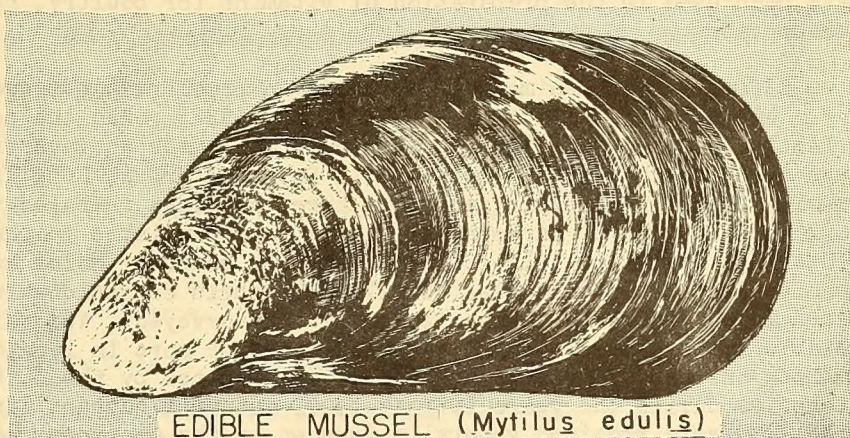
This is the first of three papers discussing the World War II promotion of the North Atlantic mussel fishery. The present article is primarily concerned with the quantitative results of a survey of the productivity of mussel areas.

INTRODUCTION

During the recent war, the fishing industry had the problem of increasing its production despite relative shortages of manpower, equipment, and materials. One of the ways of efficiently augmenting the catch of fish and shellfish was to utilize species ordinarily disregarded. One of the probable sources of sea food was the edible mussel

(*Mytilus edulis*), which is so common along the North Atlantic Coast of the United States. This species can be harvested during that time of the year when the small-boat fishery is least active.

In the late winter and the spring months, the mussels are in good condition for marketing, as it is then that they reach their fattest condition, and in this period other fishing activities are at a low level.



EDIBLE MUSSEL (*Mytilus edulis*)

The mussel, although relatively unknown to the American public, has attained great popularity in Europe. Large quantities have been consumed in European countries for hundreds of years.

The annual English, Welsh, and Scotch production of this shellfish, as recorded in the statistical reports of the British Ministry of Agriculture and Fisheries, averaged about 19 million pounds ("in the shell" weight) for the 15-year period between 1924 and 1938. In addition, large quantities of the shellfish are imported or landed by foreign boats. For example, 10½ million pounds in 1930 and 12 million pounds in 1932 were brought into Great Britain. Considering the imports and local production, nearly 30 million pounds were used annually in Great

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Britain during these years. Most of the mussels are consumed as food; some are used as bait in the long-line fisheries.

France consumes much greater quantities of mussels, and so important is this shellfish that extensive artificial cultivation has been practiced for several centuries in that country. Lambert (1935) states that generally France consumes about 143.3 million pounds, of which about one-third comes from natural beds, one-third from mussel "farms", and the balance imported from Holland.

The mussel production for 1933 in Holland, which consumes only small quantities of this shellfish, was about 144.5 million pounds, of which 44.1 million pounds were used for duck food, 4.4 million pounds for fertilizer, and 90.4 million pounds were exported to Great Britain, Germany, Belgium, and France, according to Lambert. The latter two countries absorbed about 95 percent of the Dutch exports. During 1917 and 1918, Holland shipped over 2,204,600,000 pounds of mussels to Germany, according to estimates of some Dutch mussel culturists interviewed by Lambert.

In the United States, mussels have been utilized only slightly. The records of the United States Bureau of Fisheries and the Fish and Wildlife Service show that during the 10-year period (1929 to 1940), the annual production of the mussel fishery averaged 200,000 pounds of meats, or to make the figure comparable to those given for Great Britain, less than 1,000,000 pounds ("in the shell" weight). About 75 percent of the Atlantic Coast mussels were landed in New York City. As a result of the recent war, a fishery for the ribbed mussel (Modiolus demissus) has been prosecuted in the middle Atlantic and Chesapeake Bay areas, but these mussels have been used in the preparation of vitamins for poultry, rather than for human consumption.

Efforts have been made in the past to popularize the sea mussel in this country. Field (1910a, 1910b, 1911, 1913, and 1922) noted the potentialities of an Atlantic Coast mussel fishery. Field in 1917 made an investigation of the mussel beds at Plymouth Harbor, Narragansett Bay, and around Long Island, New York. An examination of 19 localities in the three sections revealed that an estimated 2,726,000 bushels of marketable mussels were available in these areas during the winter and spring of 1917-18. In 1918, the coast of Maine was surveyed from Portland to Eastport and a total of 127,000 bushels of marketable mussels were estimated to be available in the 32 localities surveyed. According to Field, a marketable mussel was one which was two inches or more in length. Some attempts to promote the use of mussels as food were initiated by the United States Bureau of Fisheries during the years 1917 to 1919, but an important fishery never materialized. Mussels remained generally unknown to the American public.

When renewed efforts to develop a mussel fishery were under consideration in 1942, it was thought that the consumer's reaction to the product should first be evaluated. Fresh, frozen, and canned mussels, prepared in a variety of ways were served to a considerable number of people by members of the Fish and Wildlife Service. The mussels, with the exception of several frozen lots, were judged to be excellent when served in chowder, fried, or eaten raw as a cocktail. The first general test of the public's reaction to mussels was sponsored by the Massachusetts Division of Marine Fisheries. At the 1942 annual fair in Brockton, Massachusetts, steamed mussels on the half shell were served at the marine fisheries booth. The consumption of over two tons of mussels at the fair indicated that the public found the shellfish acceptable. In addition, representatives of the Massachusetts Division of Marine Fisheries prepared mussel chowders which were served in the commissaries of several Massachusetts defense plants. The enthusiastic acceptance of the mussels was most encouraging. The Division representatives

reported that the few individuals who did not enjoy mussels were those who did not like shellfish in general. It was felt that once consumers were acquainted with the excellent flavor of the mussels a demand for this new product would soon be established.

Mussels are an excellent source of protein, are rich in vitamins (riboflavin and Vitamin A), iron, copper, and iodine, and contain magnesium, phosphorus, and calcium; therefore, they would be a valuable addition to the diet. The possibilities of increased use of mussels in this country were recently stated by Herrington and Scattergood (1942, 1943) and Loosanoff (1942, 1943a, and 1943b).

As the mussel resources had been but slightly utilized along the North Atlantic coast, there was little recent available information concerning the supply of the species. Data from Field's survey of 1917-18 were available, but it was not known whether his estimates of productivity were applicable to the 1942 supplies, or whether the beds which he examined still existed. In order to determine the extent of the supply and the possibility of developing a fishery, it was necessary to make a preliminary survey of the mussel resources and the factors affecting their utilization. No attempt was made to make a complete survey.

Because of the limitations in time, it was not possible to cover the entire North Atlantic region. However, the principal mussel-producing areas between Point Lepreau, New Brunswick, and Rockland, Maine were examined. Parts of the New Hampshire and Massachusetts coastlines also were examined. Available data indicated that these areas included the most productive beds along the coast at that time.

The mussel survey was planned to provide the following information:

1. The locations and sizes of the principal mussel beds.
2. The total contents of the beds in terms of quantity and size of mussels.
3. The yield in pounds of meat per bushel for each area and season.
4. The quantities and sizes of pearls found in mussels taken from each area.
5. Practical methods of harvesting mussels.
6. Information concerning available canning facilities, boats, and manpower.

The mussel surveys of 1942 and 1943 were made possible by the active cooperation of the Maine Department of Sea and Shore Fisheries, Maine Development Commission, New Hampshire Fish and Game Department, Massachusetts Division of Marine Fisheries, Fisheries Research Board of Canada, Canadian Department of Fisheries, and interested cannery operators and fishermen. Without this assistance much less ground could have been covered with the time and personnel available.

An examination of the mussel resources of Southern New England was carried on by the United States Fish and Wildlife Service in cooperation with the Rhode Island Department of Conservation, and the Connecticut State Board of Fish and Game. The preliminary results of the survey in southern New England are given by Loosanoff (1943c).

MUSSEL SURVEY

The object of the survey was to locate and examine the most important mussel beds in the various sections. In many localities, small areas which might possess enough mussels to be worthy of a fisherman's attention were not covered; therefore, the survey represents the very minimum extent of the supply.

Local information from fishermen and fishery wardens was of great assistance in locating the mussel beds in many localities, although in general the mussel was not of any interest among the residents along the East Coast. The best information was obtained in those regions where mussels are used as fish bait or are considered to compete with soft clams (Mya arenaria) for space on some tidal flats.

SURVEY METHODS

The New Brunswick, Maine, New Hampshire, and some Massachusetts mussel beds were located near the low-tide mark; consequently, examination was relatively simple. Inspection of the bed at low tide was made either by rowing around it in a dory or by walking over it, if conditions permitted. The location, shape, and dimensions of the bed were plotted on a U. S. Coast and Geodetic Survey chart of that region and from such information, the area was determined by planimeter measurements. The variations in mussel sizes and population densities were noted, for these vary considerably on most beds, particularly where the bed extends from several feet below to several feet above the mean low-water mark. One or more samples were taken from what were considered to be characteristic parts of the bed to determine the weights of the meats and the average sizes of the mussels. In some cases, a sample from one square yard of the bed was removed. With this information it was possible to estimate roughly the total number of bushels of marketable mussels on the beds. It was not possible to determine how accurate the estimates were, but it was felt that the error was small and that the quantities were representative of the abundance of the shellfish.

In the Nantucket Island region the mussel beds were not completely exposed at low tide, but were in depths of about one to two fathoms. Here, due to the clearness of the water, most of the beds were easily seen and the examination of the remaining beds was completed by using a boat and a long-handled rake. In the Cape Cod Bay region, the mussels were located by dredging.

All mussel samples were washed free of mud and the dead mussels and shells were separated from the live mussels. The ratio of live mussels to dead mussels and shells was recorded. The live mussels were measured for individual lengths and the ratio of the volume of mussels over two inches in length to those under two inches was ascertained. The meats were removed from those mussels above two inches to obtain the yield per bushel.

LOCATION, AREAS, AND TOTAL CONTENTS OF BEDS

Table 1 presents the data on the locations, areas, and total contents of the mussel beds.

In New Brunswick, the region between Point Lepreau and Saint Andrews was examined during November 1943. Musquash, Beaver, L'Etang, and Bocabec Harbors were not surveyed because information from representatives of the Fisheries Research Board of Canada and the Canadian Department of Fisheries indicated that few mussels were present in those areas. Very limited supplies of mussels were found at

Lepreau Point, Lepreau Harbor, Mill Cove, Midjik Bluff, Digdequash Inlet, Parker, Jameson, and McMaster Islands (Figure 1). This region was examined by Mossop (1921) during 1917 and her observations agree with those of the 1942 survey. The mussels were so small that they were considered to be of no commercial importance. To be commercially important mussels should be at least two inches long and in great enough quantities to make their harvesting profitable.

In the Eastport-Lubec region, which was surveyed during October 1943, mussel beds were not abundant. Jim Island, Spectacle Island, Pennamaquan River near West Pembroke, Scrub Island, and Long Island had small patches of mussels. The largest bed was located in Lubec Narrows at Leadurny Point. Less than 26 acres of mussel flats were discovered in the entire Eastport-Lubec section and mussels of over two inches in length were so scarce that the beds were not commercially important.

Information from fishery wardens and fishermen indicated that mussels were not abundant enough to warrant a fishery in the region extending eastward from Jonesboro, Maine, to Lubec, Maine. In order to avoid the expenditure of time on areas offering little prospects of a commercial fishery, the survey was not extended to that region.

The principal mussel areas of eastern Maine were surveyed in October and November 1942, with the exceptions of Pattens Bay, Morgans Bay, and Allen's Cove, which were examined during October 1943. Figures 2, 3, and 4 show the locations of the beds. In the Jonesport area (Jonesboro to Gouldsboro Bay) a total of 620 acres of mussel beds contained about 182,000 bushels of marketable mussels; the

Locality	Estimated Bushels Per Acre of Marketable-size Mussels (2" or more in length)	Approximate Area of Bed Containing Marketable Mussels	Total Bushels
	Number	Acres	Number
New Brunswick:			
Lepreau Point	1/	-	-
Lepreau Harbor	1/	-	-
Letite Harbor, Mill Cove	1/	-	-
Little Letite Passage	1/	-	-
Midjik Bluff	300	1	300
Digdequash Inlet	1/	-	-
Total	-	1	300
Maine, Eastport-Lubec Section:			
Moose Island Bridge	1/	-	-
Spectacle Island	1/	-	-
Jim Island	1/	-	-
Leadurny Point	1/	-	-
Long Island	1/	-	-
Scrub Island	1/	-	-
Pennamaquan River	1/	-	-
Total	-	-	-
Maine, Jonesport Section:			
Chandler River	1/	-	-
Mason Bay	1/	-	-
Indian River	15	134	2,010
West River, Goose Islands	75	75	5,625
Cape Split Harbor	600	84	50,400
Pleasant River, Reef Point	70	134	9,380
Harrington River, Ripley Islands	10	28	280
Narraguagus Bay, Back Bay	310	28	8,680
Narraguagus River, Long Point	65	8	520
Pigeon Hill Cove, Bar Island	1/	-	-
Dyer Harbor	1,210	41	49,610
Pinkham Bay	685	44	30,140
Joy Bay	570	44	25,080
Total	-	620	181,725
Maine, Frenchman Bay Section:			
Winter Harbor	500	2	1,000
Stave Island Harbor	380	65	24,700
Hog Island	100	3	300
Soward's Island	75	35	2,700
Ingall's Island	195	10	1,950
Sullivan Harbor, Moon Ledge	145	7	1,015
Raccoon Cove	180	225	40,500
Skilling's River	100	10	1,000
Jordan River	1/	-	-
Total	-	358	73,165
Maine, East Penobscot Bay Section:			
Pattens Bay	1/	-	-
Morgans Bay	1/	-	-
Blue Hill Harbor	1/	-	-
Allen's Cove	1/	-	-
Herrick Bay	160	248	39,680
Centre Harbor	335	3	1,005
Deer Isle, Fish Creek	80	129	10,320
Deer Isle, Greenlaw's Cove	75	100	7,500
Deer Isle, Webb Cove	1/	-	-
White Island	500	1	500
Jim's Island	100	1	100
John Island	575	5	2,875
Opechee Island	50	5	400
Swans Island, Mackerel Cove	10	39	390
Swans Island, Atlantic Harbor	40	13	520
Isle au Haut Harbor	375	4	1,500
Total	-	551	64,790
New Hampshire:			
Hampton River	1/	-	-
Massachusetts:			
Duxbury Bay	1/	-	-
Chatham	1/	-	-
Nantucket, Muskeget Island	2	125	250
Nantucket, Maddaket Harbor	600	21	12,600
Total	-	146	12,850

1/Commercially unimportant because of comparative absence of mussels over two inches in length

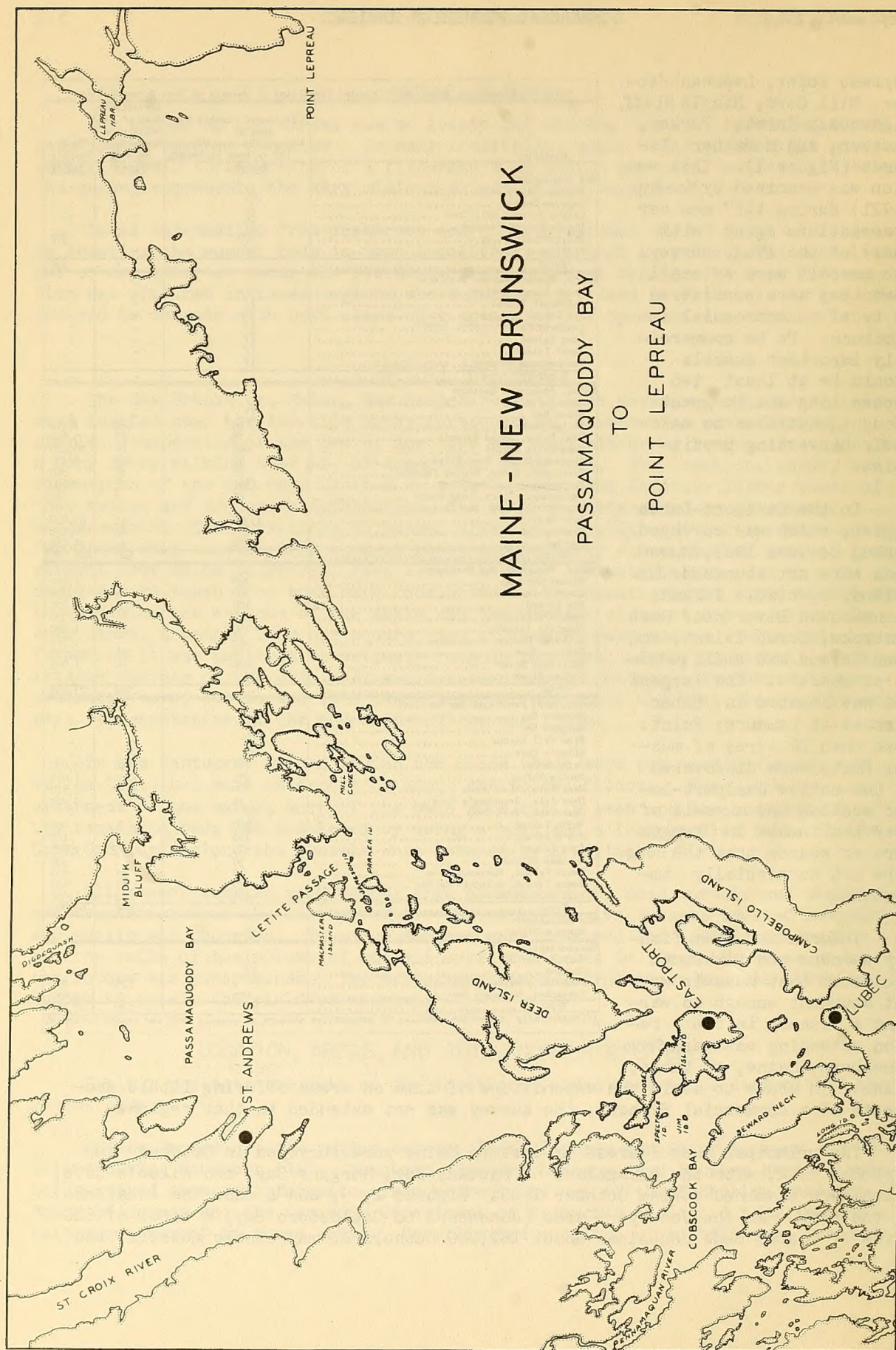


FIGURE 1 - REGIONS SURVEYED BUT IN WHICH MUSSELS WERE NOT FOUND TO BE PRESENT IN COMMERCIALY IMPORTANT QUANTITIES

Frenchman Bay section had 358 acres of beds and 73,000 bushels of mussels; and the East Penobscot Bay region had 551 acres of beds and about 65,000 bushels.

The survey did not investigate thoroughly the entire coastline even of any one section. The Maine coast has a very large number of islands, rocks, bays, and inlets, many of which offer favorable conditions for the growth of mussels. Most of the beds reported by fishermen, wardens, etc., were examined; however, many small beds were undoubtedly not visited, consequently, the estimated available supplies must be considered as a minimum. Furthermore, the survey of the Jonesport region was more intensive than that of Frenchman Bay, while East Penobscot Bay received the least attention. The

reason for this difference was that there was insufficient time to examine the latter two areas as thoroughly as the first; therefore, a comparison of the relative productivity of the three regions cannot be made from the survey. As the

fishery developed, the mussel gatherers found many more small beds, particularly in Hancock County.

The areas around Mount Desert, Vinalhaven, and North Haven Islands, and West Penobscot Bay, were not surveyed. Wardens of the Maine Department of Sea and Shore Fisheries reported that a good supply of mussels was present around Mount Desert Island; however there was little available information about the other three sections. The remaining sections of the Maine coast between Rockland and Portland were not examined, but fisher-

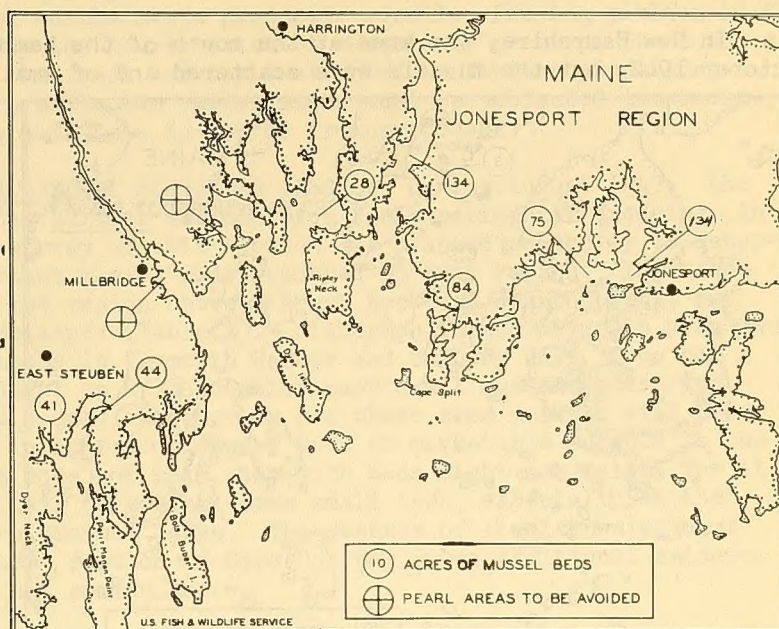


FIGURE 2 - PRINCIPAL MUSSEL BEDS OF THE JONESPORT, ME., REGION.

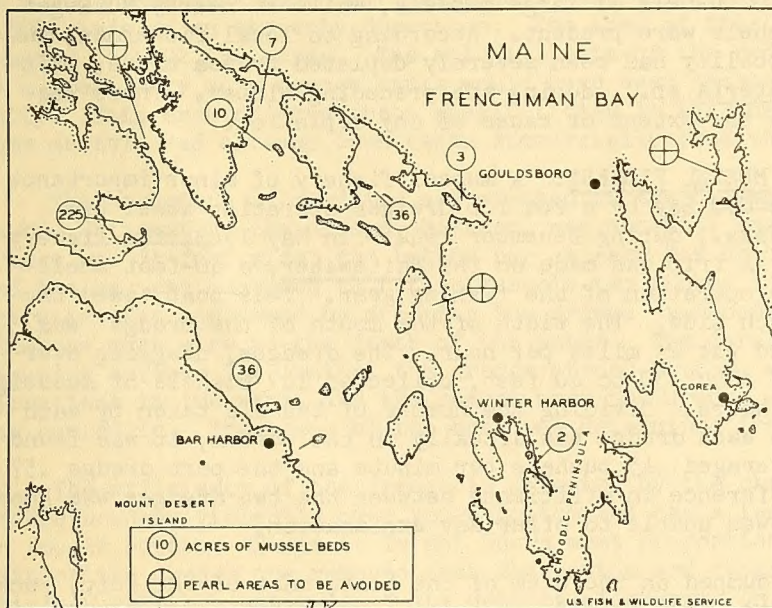


FIGURE 3 - PRINCIPAL MUSSEL BEDS OF THE FRENCHMAN BAY, ME., REGION.

men who were familiar with both the sizes of the beds and mussels reported large quantities. No beds of commercial importance were reported by wardens or fishermen in the coastal area between Portland and Kittery, Maine.

In New Hampshire, the area at the mouth of the Hampton River was examined in October 1942, but the mussels were scattered and of small size. Fishermen and

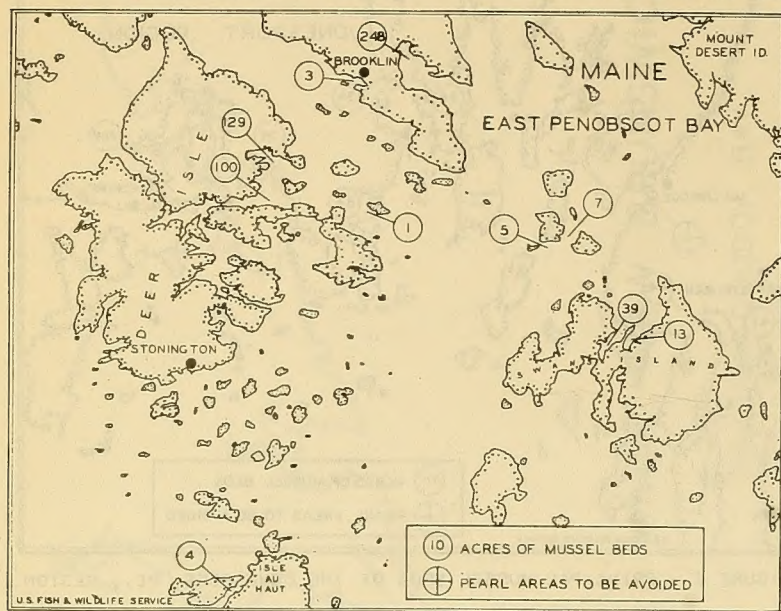


FIGURE 4 - PRINCIPAL MUSSEL BEDS OF THE EAST PENOBSCOT BAY, ME., REGION.

conservation officers did not believe that a mussel fishery was possible in that State, due to the scarcity of large mussels. The Great Bay area was not surveyed because of lack of any information on possible mussel beds.

Some regions in Massachusetts also were visited. In December 1942, Plymouth Harbor and Duxbury Bay in Massachusetts were examined. Although there were 36 acres of mussels present in the intertidal zone, the mussels were generally so small that a fishery would be impractical. Chatham Harbor, also examined at this time, contained only

mussels under two inches in length. In April 1943, Maddaket Harbor at Nantucket Island contained about 16,000 bushels of large mussels, while at nearby Muskeget Island, an estimated 250 bushels were present. According to local fishermen, the mussel beds at the latter locality had been severely depleted by sea birds, principally the eider duck (*Somateria* sp.), during the preceding winter. There was no definite evidence to show the extent or cause of any depletion.

OBSERVATION OF A SMALL MUSSEL FISHERY: A mussel fishery of minor importance was being carried on in Cape Cod Bay by a scallop dredger operating about two miles northeast of Dennis, Mass., during December 1942. In May 1943, the fishery was resumed by three boats. A trip was made on the Whitewater, a 40-foot shellfish dredger, to observe the operation of the fishing gear. This boat towed two scallop dredges, one from each side. The width of the mouth of the dredge was seven feet. The towing speed was $2\frac{1}{2}$ miles per hour. The dredges, dragging over a muddy bottom at a depth of about 30 to 40 feet, collected 147 bushels of mussels in slightly less than three hours. Dividing the number of bushels taken by each dredge by the length of time each dredge was actually on the bottom, it was found that the starboard dredge averaged .45 bushels per minute and the port dredge .57 bushels per minute. The difference in efficiency between the two dredges was known to the boat operator but he was unable to offer any explanation.

After the mussels were dumped on the deck of the boat, most of the kelp, rocks, whelks (*Buccinum undatum*), etc. were culled out and the mussels were shoveled into burlap bags. Examination of the contents of the bags revealed that about 80 percent of the volume was live mussels, the remaining 20 percent being empty shells, rocks, sand dollars (*Echinarachinus parma*), and other debris.

On the same trip, the Whitewater dredged for scallops and caught 96 pounds of meats in over 5 hours. While the scallop fishing may not have been particularly productive in that region, some comparison can be made between the productivity of the two fisheries in terms of edible meats produced. Scallop fishing yielded 18.8 pounds of meats per hour while the hourly catch of mussels in terms of fresh meats was 645.7 pounds. However, the fresh scallop meats need no further processing before reaching the consumer, while the mussel meats must be subjected to considerable handling before being sold as a canned or frozen product.

EXPERIMENTAL MUSSEL DREDGING BY SERVICE'S VESSEL: During August 1943, the Fish and Wildlife Service boat Skimmer was employed for experimental dredging in the Cape Cod Bay area. The survey of this section was planned primarily to determine the extent of the important mussel beds reported in that region. Thirteen dredging hauls were made in the region between Brant Rock and Scorton Neck, but no marketable mussels were obtained (Table 2). Fishermen in the Plymouth area were unaware of any beds except those in Plymouth Harbor and Duxbury Bay. Tows No. 6 and 7, off Plymouth Bay, brought up kelp on which many small mussels measuring 1/16 to 5/16 of an inch were found. Whether or not these seed mussels will form a bed is questionable. The failure to discover beds of marketable mussels in the Brant Rock-Scorton Neck area does not mean that such beds might not exist, for it would be relatively easy to fail to contact some small beds, especially as the number of dredging operations was not large. The absence of local knowledge of mussel beds in the northwestern portion of Cape Cod Bay gives additional evidence that marketable mussels are not common there.

Mussels were dredged in the area between Billingsgate Shoal and the Brewster-Dennis shores. From the results of the Skimmer's dredge hauls as shown in Table 2, a rough idea may be obtained of the size of this mussel-producing section. The probable center of the mussel bed or beds, is about 2,700 yards southwest of the Billingsgate Shoal buoys, which mark its northern limits, and its southern limit is about 3,300 yards north of the Sesuit Harbor breakwater. Its greatest length is 6,000 yards in a north northeast half east direction and its greatest width 3,600 yards in an easterly direction. The area of this bed has been roughly estimated to be 2,450 acres. The actual limits of the bed are not known exactly, as a great many more dredge hauls would have been necessary to plot the area exactly. This area offered great possibilities in 1943 and, as mentioned before, some mussels had already been taken commercially from the region.

The technique of dredging as employed on the Skimmer varied little from that on the Whitewater; the dredge, however, was somewhat smaller. The mouth of the dredge was $3\frac{1}{2}$ feet wide; the bottom bar or rake bar held 11 one-inch square teeth; and the bag was designed to retain mussels two inches in length. The dredging operation was performed by dropping the dredge overboard and paying out about three times as much wire as the depth of the water. The duration of the tow was the time elapsing between the instant the dredge struck bottom, which was determined by the vibrations in the wire, and the moment when the dredge left the bottom as the wire was hauled in. The speed of the boat was determined frequently by ship logs.

The efficiency of the dredge is affected by the character of the bottom. The dredge bounces violently over rough bottom and has a less marked jumping effect on smooth bottom. Since it is not known what proportion of the mussels in the path of the dredge are removed from the bottom and retained, it is not possible to obtain a reliable estimate of the density of mussels on the beds, unless a considerable number of data are accumulated concerning the efficiency of the dredge. Frey

Table 2 - Record of Mussel Dredging in Cape Cod Bay by the Service's Tug, "Skinner"									
Tow No.	Date	Position		Locality	Depth	Duration of Tow	Direction of Tow	Length of Tow	Catch ^{1/}
	1943	Latitude, N.	Longitude, W.		Feet	Minutes		Feet	
1	Aug. 26	41° 58' 51"	70° 35' 0"	Plymouth Bay	44	10	N	2,050	Sand dollars
2	Aug. 27	42° 2' 43"	70° 37' 34"	Off Duxbury Beach	48	13	N 1/2 E	2,655	do
3	do	42° 3' 14"	70° 38' 9"	do	25	10	N 1/2 E	2,050	Kelp
4	do	42° 3' 33"	70° 38' 13"	do	34	3	NE by E	2,050	Nothing
5	do	41° 58' 2"	70° 34' 57"	Plymouth Bay	45	10	W by N	2,050	Sand dollars
6	do	41° 59' 9"	70° 35' 36"	do	36	10	S by E	2,050	Sand dollars, kelp, many seed mussels
7	do	41° 59' 25"	70° 35' 36"	do	22	10	SW	2,050	do
8	Aug. 29	41° 49' 51"	70° 30' 21"	Off Sagamore Beach	28	10	SW by S 1/2 S	2,050	Kelp
9	do	41° 59' 16"	70° 30' 35"	do	29	10	SW by S 1/2 S	2,050	Sand dollars
10	do	41° 59' 6"	70° 29' 41"	do	40	10	S by W 1/2 W	2,050	do
11	do	41° 48' 23"	70° 29' 38"	do	38	10	E by S 1/2 S	2,050	2 scallops, sand dollars
12	do	41° 46' 32"	70° 26' 56"	Off Spring Hill Beach	40	10	SE by E 1/2 E	2,050	1 horse mussel, sand dollars
13	do	41° 46' 1"	70° 23' 52"	Off Scorton Neck	59	10	SE by E 1/2 E	2,050	Nothing
14	Aug. 30	41° 49' 45"	70° 3' 18"	Brewster to Billingsgate Shoal	42	10	E	2,050	12 quarts mussels
15	do	41° 49' 50"	70° 9' 0"	do	41	10	E	2,050	1 quart mussels
16	do	41° 49' 54"	70° 8' 48"	do	39	10	E	2,050	Kelp
17	Aug. 31	41° 46' 6"	70° 15' 48"	Off Barnstable Bar	47	10	N by E 1/2 E	2,050	Sand dollars
18	do	41° 46' 58"	70° 16' 12"	do	52	10	N by W 1/2 N	2,050	do
19	do	41° 46' 47"	70° 16' 8"	do	45	10	S by E 1/2 E	2,050	do
20	do	41° 45' 33"	70° 15' 43"	do	39	10	W by N 1/2 N	2,050	do
21	do	41° 45' 33"	70° 15' 38"	do	39	10	N by E 1/2 E	2,050	do
22	do	41° 46' 32"	70° 16' 51"	do	51	10	N by E 1/2 E	2,050	2 scallops, whelks
23	do	41° 47' 22"	70° 16' 59"	do	57	10	N by E 1/2 E	2,050	7 scallops, sea urchins
24	do	41° 47' 50"	70° 17' 51"	Off Sandy Neck	64	10	W by N 1/2 N	2,050	Sand dollars, starfish
25	do	41° 47' 10"	70° 18' 32"	do	59	10	S by W 1/2 W	2,050	Sand dollars, sea urchins
26	do	41° 46' 12"	70° 18' 35"	do	54	10	S by W 1/2 W	2,050	Sand dollars
27	Sept. 2	41° 46' 42"	70° 11' 22"	Dennis to Billingsgate Shoal	41	10	E	2,050	Kelp
28	do	41° 46' 48"	70° 10' 53"	do	41	10	E	2,050	5 quarts mussels
29	do	41° 46' 53"	70° 10' 23"	do	41	10	E	2,050	Kelp
30	do	41° 46' 58"	70° 9' 57"	do	40	10	E	2,050	do
31	do	41° 46' 14"	70° 11' 12"	do	37	10	W	2,050	1 quart mussels
32	do	41° 46' 13"	70° 10' 42"	do	38	10	E	2,050	1 mussel
33	Sept. 5	41° 47' 5"	70° 9' 34"	do	34	10	N	2,050	32 quarts mussels
34	do	41° 47' 23"	70° 9' 41"	do	34	10	N	2,050	12 quarts mussels
35	do	41° 47' 41"	70° 9' 48"	do	34	10	E	2,050	5 mussels
36	do	41° 47' 45"	70° 9' 22"	do	27	5	E	1,025	Nothing
37	do	41° 47' 48"	70° 9' 12"	do	28	10	E	2,050	12 mussels
38	do	41° 47' 53"	70° 8' 47"	do	28	10	E	2,050	42 quarts mussels
39	do	41° 47' 58"	70° 8' 24"	Brewster to Billingsgate Shoal	27	10	E	2,050	16 quarts mussels
40	do	41° 45' 4"	70° 8' 0"	do	29	10	E	2,050	11 quarts mussels
41	do	41° 48' 9"	70° 7' 35"	do	28	10	E	2,050	Many small mussels
42	do	41° 48' 14"	70° 7' 11"	do	28	10	E	2,050	do
43	do	41° 48' 19"	70° 6' 47"	do	27	10	E	2,050	do
44	do	41° 48' 24"	70° 6' 23"	do	26	10	E	2,050	Kelp
45	do	41° 48' 30"	70° 6' 0"	do	26	10	S	2,050	do
46	do	41° 47' 24"	70° 8' 22"	do	23	10	S	2,050	Nothing
47	do	41° 48' 3"	70° 8' 37"	do	26	10	W	2,050	1 quart mussels
48	do	41° 48' 20"	70° 8' 44"	do	29	10	N	2,050	19 quarts mussels
49	do	41° 48' 38"	70° 8' 52"	do	35	10	N	1,500	42 quarts mussels
50	do	41° 48' 51"	70° 8' 56"	do	36	10	N	1,500	31 quarts mussels
51	do	41° 49' 6"	70° 9' 1"	do	36	10	N	1,500	26 quarts mussels
52	do	41° 49' 19"	70° 9' 6"	do	42	10	N	1,500	2 mussels, 7 horse mussels
53	do	41° 49' 33"	70° 9' 12"	do	46	10	N	1,500	57 quarts mussels
54	Sept. 6	41° 49' 15"	70° 10' 18"	Dennis to Billingsgate Shoal	31	10	S	2,050	Sand dollars
55	do	41° 48' 56"	70° 10' 13"	do	46	10	S	2,050	do
56	do	41° 48' 38"	70° 10' 5"	do	41	10	S	2,050	do
57	do	41° 48' 19"	70° 10' 5"	do	41	10	S	2,050	5 mussels
58	do	41° 47' 57"	70° 9' 57"	do	37	5	S	1,025	Nothing
59	do	41° 47' 44"	70° 9' 54"	do	35	7	S	1,435	1 quart mussels
60	do	41° 47' 25"	70° 9' 51"	do	32	10	S	2,050	2 horse mussels
61	do	41° 46' 59"	70° 9' 43"	do	32	10	S	1,800	2 mussels, 3 horse mussels
62	do	41° 46' 42"	70° 9' 40"	do	32	10	S	1,800	1 horse mussel, many seed mussels
63	do	41° 46' 25"	70° 9' 37"	do	32	10	S	1,800	2 mussels, many seed mussels
64	do	41° 46' 3"	70° 9' 57"	do	32	10	N	2,050	3 horse mussels, many seed mussels
65	do	41° 46' 21"	70° 10' 5"	do	32	10	N	2,050	2 horse mussels
66	do	41° 46' 42"	70° 10' 12"	do	36	10	N	2,050	2 horse mussels
67	do	41° 47' 0"	70° 10' 19"	do	32	10	N	2,050	1 horse mussel
68	do	41° 47' 19"	70° 10' 26"	do	36	10	N	2,050	6 mussels
69	do	41° 47' 38"	70° 10' 32"	do	42	10	N	2,050	4 mussels, 1 horse mussel
70	do	41° 48' 20"	70° 11' 33"	do	46	10	S 1/2 W	2,050	Scallops
71	do	41° 48' 2"	70° 11' 31"	do	48	7	N 1/2 E	1,435	do
72	do	41° 48' 16"	70° 11' 32"	do	47	7	S 1/2 W	1,435	do
73	do	41° 48' 2"	70° 11' 31"	do	47	5	S 1/2 W	1,025	do
74	do	41° 47' 35"	70° 11' 30"	do	37	10	S 1/2 W	2,050	8 mussels, 3 scallops
75	do	41° 47' 16"	70° 11' 27"	do	40	8	S 1/2 W	1,540	3 mussels, 3 scallops
76	do	41° 47' 0"	70° 11' 25"	do	36	10	S 1/2 W	2,050	Sand dollars
77	do	41° 46' 42"	70° 11' 24"	do	36	10	S 1/2 W	2,050	2 horse mussels

^{1/} Common and scientific names: Sand dollar (*Echinarchinus parma*); Sea urchin (*Strongylocentrotus drobachensis*); Starfish (*Asterias vulgaris* and *A. forbesii*); Kelp (*Sargassum undatum*); Mussel (*Mytilus edulis*); Horse mussel (*Modiolus modiolus*); Scallop (*Pecten macellanicus*); Kelp - Principally members of the *LA-INFARACEAE*.

(1946) cites similar difficulties with dredging operations in oyster population studies. In view of such difficulties, no attempt has been made to estimate the abundance of mussels in the Cape Cod Bay area.

(This article will be continued in the October 1949 issue of this periodical)

E VALUE RATIOS FOR GRAYFISH, SOUPFIN SHARK, SABLEFISH, AND HALIBUT LIVER OILS PRODUCED IN THE PACIFIC NORTHWEST

By F. Bruce Sanford** and Elizabeth Vaughan**

ABSTRACT

Ratios of the amount of light absorbed at the wave lengths 300, 328, and 350mmu, by vitamin A in several species of fish liver oils were investigated. The average values of these ratios, the variation to be found, and the maximum and minimum values to be expected on a probability basis are given.

INTRODUCTION

Through the cooperation of the Pacific Northwest vitamin A processors, E value ratios for a substantial number of commercial batches of grayfish, soupfin shark, sablefish, and halibut liver oils have been made available to the Seattle Technological Laboratory. The data were taken over a number of years, and they are representative of a large tonnage of livers.

Ratios are used to evaluate the results obtained by the spectrophotometric method of vitamin A analysis. Since this method is widely employed, and since the bulk of the vitamin A oils produced in the United States are of the four types here considered, these data are believed to be important.

Two ratios were investigated. These are $E(300\text{mmu.})/E(328\text{mmu.})$ and $E(350\text{mmu.})/E(328\text{mmu.})$. The purpose of this paper is to give the average values of these ratios, the variation to be found, and the maximum and minimum values to be expected on a probability basis.

Table 1 - Data on the Ratio $E(300\text{mmu.})/E(328\text{mmu.})$ ^{1/}

Type of oil ^{2/}	Number of samples ^{3/}	Average value of ratio	Standard deviation	Coefficient of variation	Range in which 95% of the ratios are expected to fall	Range in which 99% of the ratios are expected to fall ^{4/}
	n	\bar{x}	s	$100s/\bar{x}$	$\bar{x} \pm 1.96s$	$\bar{x} \pm 2.571s$
Grayfish (<i>Squalus suckleyi</i>)	35	0.6673	0.0355	5.32	0.5977-0.7369	0.5760-0.7586
Soupfin shark (<i>Galeorhinus zyopterus</i>)	107	0.6651	0.0275	4.13	0.6112-0.7190	0.5944-0.7358
Sablefish (<i>Anoplopoma fimbria</i>)	30	0.6086	0.0199	3.27	0.5696-0.6476	0.5574-0.6598
Halibut (<i>Hippoglossus hippoglossus</i>)	89	0.5968	0.0185	3.10	0.5605-0.6331	0.5492-0.6444

^{1/} These data were taken by means of the Beckman spectrophotometer employing a tungsten light source. The slit widths were not standardized. The solvent used was isopropanol.

^{2/} The manufacturers stated that to the best of their knowledge the oils were not mixtures and that they were representative of commercial oil shipments from the Pacific Northwest.

^{3/} The grayfish data were taken during the year 1947. The soupfin shark, sablefish, and halibut data were taken in the years 1944-47. The data for each type of fish are representative of many tons of livers.

^{4/} The mere fact that the ratios for an oil fall within a given range is no guarantee that the oil is of a given type or even that it contains vitamin A. Conversely, the fact that the ratios do not fall within the specified range is no proof that the oil is not of the type claimed. It must be remembered that these are the variations encountered in the Pacific Northwest with large lots of oils. Smaller lots or oils processed elsewhere may not exhibit the same variation. The data do give a good indication, however, of what should reasonably be expected.

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OBSERVATION ON E VALUE RATIOS DATA

Table 2 - Statistics on the Comparison of Means for the Ratio E300mmu. to E328mmu. and their Interpretation

Oils whose means are compared	Degrees of freedom	"Student's" t	Probability	Significance of difference between means
Grayfish and soupfin shark ...	140	0.38	0.70	not significant
Grayfish and sablefish	63	8.02	less than 0.001	highly significant
Grayfish and halibut	122	14.42	less than 0.001	very highly significant
Soupfin shark and sablefish ..	135	10.52	less than 0.001	very highly significant
Soupfin shark and halibut	194	20.00	less than 0.001	very highly significant
Sablefish and halibut	117	2.96	0.001 < P < 0.01	significant

The average values of the ratios are given in Tables 1 and 3 as are also their coefficients of variation. In the case of a natural product, such as a fish liver oil, one might anticipate that its properties would be widely variable. In view of this probable variation, the compiled data show that the individual ratios are surprisingly constant. The maximum coefficient of variation found for any one of them is only 5.32 percent. This value is of the same order of magnitude as the instrumental error in making the measurements. It can be noted that, in the case of

Table 3 - Data on the Ratio E350mmu. to E328mmu.

Type of oil	Number of samples	Average value of ratio	Standard deviation	Coefficient of variation	Range in which 95% of the ratios are expected to fall	Range in which 99% of the ratios are expected to fall
	n	\bar{x}	s	100s/ \bar{x}	$\bar{x} \pm 1.96s$	$\bar{x} \pm 2.571s$
Grayfish	35	0.5815	0.0157	2.70	0.5507-0.6123	0.5411-0.6219
Soupfin shark	107	0.5696	0.0089	1.56	0.5522-0.5870	0.5467-0.5925
Sablefish	30	0.6415	0.0246	3.83	0.5933-0.6897	0.5783-0.7047
Halibut	89	0.6600	0.0202	3.06	0.6204-0.6996	0.6081-0.7119

the shark oils, the greatest variation is in the E(300mmu.)/E(328mmu.) ratio, while in the case of the food fishes, the greatest variation is in the E(350mmu.)/E(328mmu.) ratio. It is also interesting to note that the average values of the E(300mmu.)/E(328mmu.) ratio are similar for the oils from the two species of shark and that they are higher than the ratios for the oils from the food fish, while the converse is true for the E(350mmu.)/E(328mmu.) ratio. Another observation is that even at the 99 percent level, the ranges for the E(350mmu.)/E(328mmu.) ratios of the oils from the soupfin shark and halibut do not overlap.

A statistical analysis (Tables 2 and 4) of the data shows that, except for the ratios E(300mmu.)/E(328mmu.) for grayfish and soupfin shark, all other ratios presented here differ significantly.

Table 4 - Statistics on the Comparison of Means for the Ratio E350mmu. to E328mmu. and their Interpretation

Oils whose means are compared	Degrees of freedom	"Student's" t	Probability	Significance of difference between means
Grayfish and soupfin shark ..	140	5.61	less than 0.001	highly significant
Grayfish and sablefish	63	14.23	less than 0.001	very highly significant
Grayfish and halibut	122	24.10	less than 0.001	very highly significant
Soupfin shark and sablefish ..	135	25.78	less than 0.001	very highly significant
Soupfin shark and halibut	194	41.73	less than 0.001	very highly significant
Sablefish and halibut	117	4.10	less than 0.001	highly significant





July 1949

College Park, Md.

After 8 months of storage, the striped bass fillets held at a constant temperature of -10° and 0° F., and at temperatures fluctuating between these two points received satisfactory scores. The scores were essentially the same for the three groups. The appearance and odor in the frozen state were still satisfactory. After thawing, however, a rather fishy odor was apparent. The color, though not as bright as for fresh fillets, still had not become objectionable.

The samples held at a constant temperature of 15° F. and at temperatures fluctuating between 0° and 15° F. had decreased considerably in quality and definitely would be unsalable, with the latter receiving the higher scores of the two lots. Though not so noticeable in the frozen state, the fillets after thawing had a strong fishy odor and were very noticeably discolored. The discoloration does not seem to follow any particular pattern, however, and may be dark, a very flat light color, or have yellow streaks, as sometimes found with fatty fish after a period of storage.

Volatile acid numbers (state of freshness) have increased very little over those for the sixth-month period. It was interesting to note that, while probably not statistically significant, the number for the samples undergoing fluctuating temperatures between -10° and 0° F. falls between the numbers for samples held at a constant temperature of -10° F. and constant temperature of 0° F. A similar condition had occurred with the samples held at 0° and 15° F. and fluctuating temperatures between these two points.

* * *

The frozen fish covered with different wrapping and glazing combinations had changed very little in quality after four months of storage. The fish which were wrapped before freezing and not glazed were showing very slight but almost negligible surface drying.

Ketchikan, Alaska

The survey of clam beaches in the vicinity of Sitka indicated that clams from this area were suitable for canning. Clams from other Southeastern areas were considered suitable for processing as minced clams provided the entire neck of the clam is removed.

Seattle, Wash.

When the current feeding trials in the development of food for hatchery fish were only about 30 percent complete, a preliminary observation indicated that raw salmon eggs possess a growth factor potential for young salmon which is greater than any food material so far tested in this study. However, no definite conclusions can be drawn until the present feeding experiments are completed.



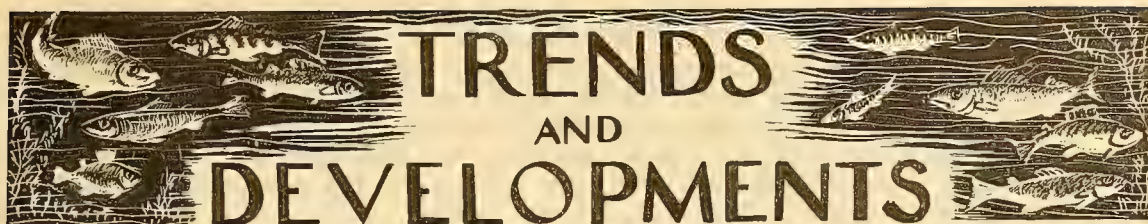
OYSTERS AU GRATIN



1 pint oysters
6 slices buttered toast
2 eggs, beaten
1 teaspoon salt

1 teaspoon prepared mustard
 $\frac{1}{2}$ teaspoon paprika
1 cup grated cheese
 $\frac{1}{2}$ cup milk

Trim crusts from bread. Cut each slice into quarters. Combine beaten eggs, seasonings, and milk. Arrange layer of bread in buttered casserole, cover with layer of oysters. Sprinkle with grated cheese. Repeat layer, pour milk mixture over contents of dish, and cover with grated cheese. Place casserole in pan of hot water, bake in moderate oven 350° F. for 30 minutes or until brown. Serves 6.



TRENDS AND DEVELOPMENTS

Additions to the Fleet of U. S. Fishing Vessels

First documents as fishing craft were received by 94 vessels of 5 net tons and over during June 1949--42 less than in June 1948, according to the Bureau of Customs of the Treasury Department. California led with 20 vessels, followed by Washington with 15, and Florida with 13. During the first six months of 1949, a total of 495 vessels were documented, compared with 563 during the same period in 1948.

Vessels Obtaining Their First Documents as Fishing Craft, June 1949					
Section	June		Six mos. ending with June		Total
	1949	1948	1949	1948	1948
	Number	Number	Number	Number	Number
New England	3	6	14	26	52
Middle Atlantic	5	9	30	27	40
Chesapeake Bay	8	6	35	20	59
South Atlantic and Gulf	32	47	174	227	541
Pacific Coast	38	47	146	177	347
Great Lakes	2	7	27	25	51
Alaska	6	14	66	56	81
Hawaii	-	-	3	5	12
Total	94	136	495	563	1,183

Note: Vessels have been assigned to the various sections on the basis of their home port.



California Sardine Quota for Reduction Purposes Changed

The quota of sardines which may be reduced into fish oils and meal was upped from 50,000 tons to 75,000 tons for the 1949-50 season by the California fish and game commissioners at their July meeting in San Diego, according to the July 27 Outdoor California of the California Division of Fish and Game. The new figure is the lowest reduction quota in State history and is 25,000 tons below last year's limit. (See Commercial Fisheries Review, August 1949.)

The tonnage quota will be allocated equally among 47 sardine canners and 54 straight-reduction operators.

Following protests from fishermen and boat owners, the Commission refused to renew the 8-inch sardine size limit ruling, which expired July 31.



Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, June 1949: The Army Quartermaster Corps purchased 1,305,391 pounds (valued at \$430,175) of fresh and frozen fishery products for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding during June 1949, compared with \$1,234,229 pounds (valued, \$393,676) for May 1949, and 1,410,309 pounds (valued, \$461,212) for June 1948. For the first six months in 1949, purchases amounted to 7,880,324 pounds (valued, \$2,644,674), compared with the 1948 six-months total of 7,924,630 pounds (valued, \$2,875,420).



Fishery Biology Notes

"ALBATROSS III": Census of Groundfish Populations Continued (Cruise 26): The Albatross III on cruise 26 (July 27-August 5, 1949) continued the census of groundfish populations on Georges Bank, which was begun in 1948. Eighty one-half hour tows were made at sixty-one stations in depths from 13 to 115 fathoms.

Large numbers of scrod haddock, chiefly one-year-old fish, were caught on the southern, eastern, and northern part of the Bank in less than 40 fathoms. Commercial quantities of large haddock were found in 90-100 fathoms off the northern edge.



MEASURING HADDOCK ABOARD THE ALBATROSS III

A large bed of sea scallops was discovered approximately 90 miles E. 3/4 S. of Nantucket Lightship in 42-44 fathoms, and 14 bushels of these shellfish were caught in a half-hour tow with a 1½ Iceland trawl equipped with rollers.

Yellowtail flounders (51) were tagged on the southern part of Georges Bank to supplement existing information on migration of this species.

EXPERIMENTAL PLANTING OF EUROPEAN OYSTERS: A small experimental planting of the European oysters, (*Cstrea edulis*) will be made in September by the Fish and Wildlife Service in Maine waters. A small group of these oysters will be planted near the U. S. Fishery Laboratory at Boothbay Harbor, some in Taunton River, near West Franklin, and others in Basin Grove, near South Harpswell. The purpose of this experiment is to determine whether the oysters will survive the Maine winter. A similar experiment will be conducted in Milford Harbor this winter to determine if they will survive in Connecticut waters.

SARDINE INVESTIGATION CRUISES: The Chief of the Service's South Pacific Fishery Investigations, Stanford, California, reports that examination of the material from Cruises 1 and 2 of the Black Douglas is now complete; the material of Cruise 3 is being examined. On Cruise 1, evidence of very light sardine spawning was found in the area south of San Diego. On Cruise 2, very intensive spawning was encountered, but again on the southern lines only. On Cruise 3, sardine spawning was most intense off San Diego and out to a distance of about 300 miles offshore.

First stations of the Black Douglas are about 30 to 40 miles offshore and relatively few inshore forms are taken. It has been possible to identify most of the young fish taken as to family or genus, and earlier ideas of the abundance and distribution of some species have been altered. For instance, the hake is abundant and widely distributed in the areas covered.

Specimens of the following were collected:

The ragfish (Ichthyia lockingtoni) (formerly considered rare).

The rockfish group (the young of which are found well out on the station lines, Vinciguerria and Cyclothone (two deep sea forms which are dominant off Lower California)).

The jack mackerel (which coincides in distribution with the previous two and occurs farther offshore when taken to the northward).

The lantern fish group is the most abundant of all five distinct larval types that can be recognized to date.

Trachipterus (ribbonfish) is widely distributed.

The deep sea smelts (Bathylagus, etc.) are almost as abundant as the lantern fish.

SPONGE FISHERY INVESTIGATION: To investigate the status of the sponge industry centered at Tarpon Springs, Florida, arrangements have been made for a joint cooperative survey to secure information on the status of the sponge stocks and particularly to learn whether the reported "disease" conditions are as serious as some reports indicate. The cooperators are the Fish and Wildlife Service, the Florida State Board of Conservation, and the Marine Laboratory of the University of Miami. This pooling of resources and facilities will make it possible to carry on a much more comprehensive survey than would otherwise be the case.

The success of the undertaking will depend largely on the cooperation received from the sponge industry itself, particularly in the way of furnishing the services of sponge boats and divers for the collection of material. It is hoped that the actual field work may be initiated during August.

The Service is assigning one of its own vessels to this survey, but this particular craft is not equipped for diving.



National Fisheries Trends, July - September 1949 ^{1/}

PRODUCTION: United States production of fishery products during the summer months may be somewhat below that of a year ago, principally because of declines

in the catches of fishery products for fresh consumption on the East and West Coasts and a prospective reduction in the landings of fish for canning.

The reported total catch of red salmon in Alaska through July 30, 1949, was almost 40 percent below last year. The impact of the small decline in fish for canning, however, should not be reflected in the consumer markets until late in 1949.

CONSUMPTION: The per capita consumption rate of fishery products by United States civilians in the next few months is expected to be approximately the same as in the comparable period of 1948. Apparent consumption of fresh and frozen fishery products during the first half of 1949 was not much different from that in the same period last year.

The market demand for canned fish was somewhat lower than in the first 6 months of 1948, and stocks at the primary distribution level at the end of the pack year (i.e., June 30, 1949) are estimated as being much larger than carryover stocks have been in recent years.

PRICES: Retail prices of fresh and frozen fishery products are likely to continue at a lower level than a year earlier, but above those in the late spring of 1949. According to the data collected by the Bureau of Labor Statistics, the retail price index of fresh and frozen fish in 56 cities during the first 6 months of 1949 averaged about 2 percent below that for the same months in 1948.

COLD STORAGE HOLDINGS: July 1 cold storage stocks of frozen fishery products for human consumption were 11 percent above a year ago. Most of the increase is due to larger holdings of salt-water fish. During the next few months, with production at the seasonal high point, cold storage stocks of frozen fishery products will be expanded so that sufficient supplies will be available for distribution during the low production period in late 1949 and early 1950.

IMPORTS: Imports of fresh and frozen cod, haddock, hake, pollock, and rose-fish fillets during the first 6 months of 1949 were somewhat less than the total for the same months of last year. However, increased imports are reported for the first 4 months of this year as compared to the corresponding period of 1948 for fresh-water fish from Canada; frozen swordfish and shrimp; canned tuna and bonito.

EXPORTS: Exports of edible fishery products during the first 5 months of this year were only about 12 percent below the total in the same period of 1948. Current trends indicate that exports in the remainder of 1949 probably will not exceed last year's level. The international balance of trade and the monetary position of some of the western European countries thus far in 1949, in addition to ample supplies of fresh and frozen fish, have tended to restrict canned fish purchases from the United States. At least in the near future, foreign expenditures in this country are likely to be further restricted to essential food and industrial machinery and equipment. The United Kingdom has recently completed a purchase program for canned pilchards. The proposed purchase of canned salmon by the United Kingdom may be adversely affected by recent actions taken by the British to limit dollar expenditures.

1/ Prepared by the Bureau of Agricultural Economics, Department of Agriculture in cooperation with the Fish and Wildlife Service.



Pacific Oceanic Fishery Investigations

PRELIMINARY TUNA SURVEY OF HAWAIIAN-LINE ISLANDS: In its preliminary tuna survey of the Hawaiian-Line Islands Area, the Section of Biology and Oceanography, of the Pacific Oceanic Fishery Investigations in Honolulu, reported in July that it has compiled data on seasons, places of occurrence, abundance, and possible methods of capture of tunas and tuna-bait fishes by studying the landings of local Hawaiian fishing vessels, interviews with fishermen, field trips in local waters, and visits to French Frigate Shoals, Palmyra, and Canton Island.

Commercial tuna fisheries in the Hawaiian-Line Islands exist only in the Hawaiian-Islands proper. In addition to diverse minor fisheries which use such gear as small surround nets and hand lines, important local tuna fisheries are conducted here. These tuna fisheries use pole and line for live bait surface fishing and long-line for subsurface fishing. The long-line catches landed at the local market were examined and information obtained on area of catch, time of catch, modification of long-lines used, amount of gear used, etc. From the detailed data recorded on the catches of 91 vessels, an analysis of the Hawaiian long-line fishery for the period from January through June is possible regarding:

1. The species composition of the catches taken by vessels operating the long-line gear and seasons of abundance for tunas and marlins taken by subsurface long-line fishing. Yellowfin tuna, big-eyed tuna, striped marlin, black marlin, white marlin, and albacore compose the bulk of the catch landed.
2. The efficiency of the long-line gear as determined from the number of hours the gear has fished, the amount of gear fished, and the amount of catch.
3. The fishing grounds producing the major catches, and the related conditions of surface current and water depths under which they are produced.
4. Construction and operation of the long-line gear.

The availability of live bait in the Hawaiian-Line Islands area appears to be a limiting factor in the development of a fishery where large tuna clippers can be operated. It has only been possible for this Section to survey briefly the live-bait situation at a few outlying islands in the Hawaiian-Line region. Year-round studies must be carried out to learn the seasonal abundance of the various small fishes that can be utilized for live bait. Japanese experience in the southwest Pacific has shown that live bait has also been a limiting factor in developing large vessel operations in that region. The frequent spawning and rapid rate of growth of the "nehu," the principal bait species, makes possible wide fluctuations in the stock of these fish in Kaneohe Bay and elsewhere.

PURSE SEINE VESSEL CONTRACT AWARDED: A contract for the construction of a purse seine vessel for exploratory fishing in Hawaiian waters and westward throughout the U. S. Trust Territory of the Pacific Islands was awarded to a boat building company in Tacoma, Washington, on June 27. With the completion of this vessel, John R. Manning, the Service will have three exploratory and research vessels assigned to the Investigations. The vessel will be of wooden construction, 86'6" in length, will have a cruising range of 7,000 miles, and should be ready in December this year.

The other two vessels (tuna-clipper type) of the Investigations, Henry O'Malley and Hugh M. Smith, former Navy YPs of the 600 class, 128 feet in length, are already

being converted for exploratory fishing and research work in West Coast shipyards. They will be completed early this fall.

WORK ON HAWAIIAN LABORATORY TO BEGIN SOON: Work will commence soon on the construction of a fishery research laboratory on a site adjacent to the campus of the University of Hawaii at Honolulu, according to a July 18 report. The contract for the construction of the building was awarded on June 27.

This laboratory will house the shoreside research activities of the Investigations. The building, to conform with typical Hawaiian architecture, will be of hollow concrete block construction, two stories high, and will essentially surround a court with lanais facing the court. Wings to provide additional space will extend outward from either side of the front of the building, and shorter wings will extend from the rear. The floor area, including lanais, will approximate 16,000 square feet. Construction should be completed in December this year.



U.S. Pack of Miscellaneous Canned Fishery Products, 1948

The pack of miscellaneous and specialty canned fishery products in 1948 amounted to 617,974 standard cases (48 cans, 16 oz. net weight, per case), valued at

Table 1 - U.S. Pack of Miscellaneous Canned Fishery Products, 1948 (Production & Value to Packer)			
Product	Std. Cases No.	Total Value \$	Location & number of plants
Fish:			
Fish cakes ^{1/}	192,357	2,425,550	Me. 4; Mass. 1; N. Y. 1; Va. 1; Calif. 3
Fish spread & paste ^{2/}	895	16,878	Mass. 1; N. Y. 1; Calif. 2
Fish, smoked or kippered ^{3/}	9,901	215,471	Mass. 3; Minn. 1; Wash. 3; Ore. 4; Calif. 1
Fish, miscellaneous ^{4/}	34,456	526,287	Mass. 2; N. Y. 1; N. J. 1; Md. 2; N. C. 1; Mich. 1; Minn. 1; Calif. 1
Shellfish:			
Crab: deviled, gumbo, etc. ^{5/}	3,352	102,372	N. Y. 1; N. C. 1; S. C. 1; Ala. 1; La. 1; Wash. 1
Lobster bisque, newburg, soup, and stew	5,284	146,873	Me. 1; N. Y. 1; La. 1
Oysters, smoked	1,036	82,452	La. 1; Wash. 3
Oysters, stew, soup, etc. ^{6/}	2,753	57,904	N. Y. 1; Ala. 1; La. 2; Wash. 4
Shrimp cocktail, bisque, creole, etc. ^{7/}	2,594	95,538	N. Y. 1; S. C. 1; Ala. 1; Miss. 1; La. 4; Wash. 1
Squid	349,799	1,373,810	Calif. 20
Terrapin & turtle meat	940	30,899	N. Y. 2; Ga. 1; Fla. 1
Terrapin & turtle soup & stew	11,820	138,754	N. Y. 2; Ohio 1; Ga. 1; Fla. 1; La. 2
Shellfish, miscellaneous ^{8/}	2,787	58,774	Me. 1; Mass. 1; N. Y. 2; La. 3
Total	617,974	5,271,562	
^{1/} Consists of cod; haddock; alewife and menhaden; rockfish; albacore and lingcod; barracuda and Mexican sea bass. ^{2/} Consists of spreads (herring, salmon, and tuna) and pastes (sardine, finnan haddie, smoked halibut, herring and salmon). ^{3/} Consists of smoked (carp flakes, finnan haddie, herring, salmon, shad and sturgeon) and kippered (alewives, herring, sablefish and sturgeon). ^{4/} Consists of carp flakes, eels in jelly, fish chowder, frog-leg newburg, mullet, red drum, salmon in cheese sauce, Spanish mackerel, tuna-fish frankfurters, and whiting. ^{5/} Includes deviled crabs, soft-shell crabs; and crab gumbo, bisque and cocktails. ^{6/} Consists of cocktails, creole, stew; and smoked paste and spread. ^{7/} Consists of bisque, balls, cocktails, creole, curry, deviled, gumbo, paste, and smoked. ^{8/} Consists of bouillabaisse, clam cakes and loaf, creole gumbo, conchs, crayfish bisque, and seafood newburg. Note: "Standard cases" represent the various-sized cases converted to the equivalent of 48 cans, each containing 16 ounces net weight.			

\$5,271,562 to the packer. The bulk of this pack consisted of fish cakes and squid. Although the pack of fish cakes is not as high as in 1947, it still is the highest for all other years since 1939. The pack of squid is not as high as in 1946, but it is the highest for all other years since 1939.



Table 2 - Pack of Canned Fish Cakes & Squid, 1939-48 (Production & Value to Packer)						
Year	Fish cakes			Squid		
	Standard Cases		Value \$	Standard Cases		Value \$
	No.	Avg. Price		No.	Avg. Price	
1948	192,357	12.61	2,425,550	349,799	3.93	1,373,810
1947	263,732	12.40	3,270,624	221,056	4.06	898,210
1946	130,662	12.02	1,570,858	592,678	5.89	3,488,469
1945	1/	-	1/	172,629	5.19	895,545
1944	73,614	10.75	791,450	130,699	5.29	691,050
1943	1/	-	1/	102,525	5.58	572,410
1942	81,988	7.92	649,671	1/	-	1/
1941	128,841	6.90	889,046	1/	-	1/
1940	115,508	6.72	776,684	22,475	3.49	78,364
1939	113,839	6.64	756,253	1/	-	1/
1/ Data not available for publication since the pack was canned by less than three firms.						

U.S. Production of Marine-Animal Scrap and Meal, 1948

The 1948 production of fish and marine-animal scrap and meal in the United States and Alaska amounted to 199,519 tons, valued at \$23,086,734 to the producer.

Table 1 - Production of Marine-Animal Scrap & Meal, 1948 (Quantity & Value to Producer)							
Product	Atlantic and Gulf Coast		Pacific Coast (including Alaska) ^{1/}		T o t a l		
	Tons	Value	Tons	Value	Tons	Price Per Ton	Value
Meal and dried scrap:							
Anchovy	-	-	163	\$ 21,517	163	\$132.01	\$ 21,517
Crab, blue	5,151	\$ 266,761	-	-	5,151	51.79	266,761
Fur seal	-	-	341	36,996	341	108.49	36,996
Groundfish ("white fish" inc. rosefish)	21,780	2,872,544	-	-	21,780	131.89	2,872,544
Herring	4,632	431,221	13,054	1,633,821	17,686	115.75	2,065,042
Menhaden	2/104,058	11,560,914	-	-	104,058	111.10	11,560,914
Pilchard	-	-	19,076	2,614,616	19,076	137.06	2,614,616
Salmon	-	-	1,152	112,223	1,152	97.42	112,223
Shark	3/	3/	4/106	4/11,178	106	105.45	11,178
Shrimp	724	49,016	-	-	724	67.70	49,016
Tuna and mackerel	-	-	21,305	2,757,778	21,305	129.44	2,757,778
Whale:							
Meat	10	700	409	40,900	419	99.28	41,600
Bone	-	-	60	3,000	60	50.00	3,000
Miscellaneous	5/3,124	319,591	6/4,374	353,958	7,498	89.83	673,549
Total	139,479	15,500,747	60,040	7,595,987	199,519	115.71	23,086,734
1/ Includes small production of unclassified meal in Minnesota and shark meal in Florida.							
2/ A small production of acidulated scrap has been included with dry scrap and meal.							
3/ Included with West Coast production.							
4/ Includes Florida production.							
5/ Includes the production of cod-liver press cake, fish pumice; and alewife, horseshoe crab, lobster, and miscellaneous fish scrap and meal.							
6/ Includes a small production of unclassified meal in Minnesota, and Dungeness crab and miscellaneous scrap and meal on the Pacific Coast.							

This was an increase of 7 percent in volume and 3 percent in value compared with the previous year. The production of menhaden scrap and meal, which exceeded 100,000 tons for the first time, accounted for over half of the volume and value

of the 1948 production. Due to the continued failure of the pilchard fishery in California, the yield of pilchard meal amounted to only 19,076 tons--only 16 per cent of the record 1936 production of 121,739 tons.

Table 2 - Production of Marine-Animal Scrap and Meal, 1939-48 (Quantity & Value to Producer)									
Year	Dry scrap and meal			Acidulated scrap			T o t a l		
	Tons	Price Per Ton	Value	Tons	Price Per Ton	Value	Tons	Price Per Ton	Value
1948	1/199,519	\$115.71	1/\$23,086,734	1/			199,519	\$115.71	\$23,086,734
1947	185,808	120.30	22,353,488	632	\$42.50	26,863	186,440	120.04	22,380,351
1946	197,599	103.04	20,360,943	2,022	38.81	78,475	199,621	102.39	20,439,418
1945	199,118	72.03	14,343,138	1,557	39.95	62,200	200,675	71.78	14,405,338
1944	210,225	71.98	15,131,918	2,922	38.02	111,104	213,147	71.51	15,243,022
1943	188,848	71.86	13,570,331	1,555	37.83	58,821	190,403	71.58	13,629,152
1942	168,486	68.52	11,545,239	2,594	31.04	80,520	171,080	67.96	11,625,759
1941	225,815	56.92	12,852,781	11,029	22.01	242,792	236,844	55.29	13,095,573
1940	177,724	42.55	7,562,288	15,520	17.50	271,533	193,244	40.54	7,833,821
1939	210,249	41.99	8,827,747	15,853	16.77	265,850	226,102	40.22	9,093,597

1/A small production of acidulated menhaden scrap has been included with dry scrap and meal.



Wholesale and Retail Prices

The wholesale index for all foods on July 12 was 164.2 percent of the 1926 average, 0.5 percent above 4 weeks ago, but 13.4 percent below the comparable period in 1948.

Canned salmon wholesale prices were steadier in July than they were in June. In July, canned pink salmon prices were 2.8 percent higher than in June, but

Wholesale and Retail Prices				
Item	Unit		Percentage change from--	
<u>Wholesale: (1926 = 100)</u>		<u>July 12, 1949</u>	<u>June 14, 1949</u>	<u>July 13, 1948</u>
All commodities	Index No.	154.2	-0.3	-8.9
Foods	do	164.2	+0.5	-13.4
Fish:		<u>July 1949</u>	<u>June 1949</u>	<u>July 1948</u>
Canned salmon, Seattle:				
Pink, No. 1, Tall	\$ per doz. cans	4.556	+2.8	-15.9
Red, No. 1, Tall	do	5.664	-2.1	-14.8
Cod, cured, large shore, Gloucester, Mass.	\$ per 100 lbs.	15.500	0	+6.9
<u>Retail: (1935-39 = 100)</u>		<u>July 15, 1949</u>	<u>June 15, 1949</u>	<u>July 15, 1948</u>
All foods	Index No.	201.7	-1.3	-7.0
Fish:				
Fresh, frozen and canned	do	307.7	-1.6	+2.0
Fresh and frozen	do	251.1	-0.4	-1.1
Canned salmon:				
Pink	¢ per lb. can	57.6	-3.4	+7.7

still were 15.9 percent below July 1948. On the other hand, canned red salmon prices in July were 2.1 percent lower than the previous month and 14.8 percent below a year ago.

Retail food prices declined 1.3 percent from mid-June to mid-July, and were now 7 percent below mid-July 1948. Prices of fresh, frozen, and canned fishery products followed the same trend and on July 15 were 1.6 percent below mid-June, but were still 2 percent above July 15, 1948. The index for only fresh and frozen fishery products on July 15 was only 0.4 percent below mid-June and 1.1 percent below mid-July 1948. Canned pink salmon retail prices were 3.4 percent lower than on June 15, but were still 7.7 percent above mid-July 1948.



THE CUBAN FISHING INDUSTRY

Unless the Cuban fishing fleet is enlarged and modernized and refrigeration is introduced, it is unlikely that production of fresh fish in Cuba during the next few years will increase beyond 30 or 40 million pounds. Production of canned tunny, albacore, bonito and sardines probably will increase and, in time may compete with sardines and tuna fish imported from the United States and Latin American countries.



HEAVY-DUTY ROW-BOATS WITH REMOVABLE MAST USED FOR COASTAL FISHING.

Effective Cuban local demand for fresh fish will continue about the same as in the past few years—roughly 30 or 40 million pounds—and will go beyond that only if refrigerated fish markets are introduced or if the price of fish declines in relation to prices of other meat.

Cuban import requirements in normal times are about 20 to 25 million pounds of dry salted (cod) and 3 million pounds of other cured and canned fish. When war-time shortages are eased, the demand for salt fish will continue about the same as before the war but that for canned products may decline owing to increasing domestic production.

Canned tunny, albacore, bonito and sardines may be exported in increasing quantities, depending on prices in Cuba and abroad. The duties applying on these commodities in the United States reportedly hamper Cuban exports.



Aden Protectorate

STATUS OF FISHERIES: For many generations fishing has been one of the important minor industries along the Aden coast, according to a May 6 report from the American Consulate at Aden. It is carried on by individual fishermen in primitive canoes and by groups of from eight to ten fishermen in sailing dhows. The market is principally to supply the needs of the local population, and large catches of sardines along the Gulf of Aden are sun dried and sold as fodder for the camels.

Excess quantities of fish, above those for local requirements, are sun dried and sold in the hinterlands and also shipped to Ceylon and India.

During the year, studies were conducted by various experts sent out from Great Britain under the Colonial Development Scheme, and while the year 1948 was an abnormally poor season for fishing, the long term outlook for the industry is considered as favorable. The most satisfactory fishing area is considered to be along the coast in the area near Mukalla and Ash Shihr. It may eventually offer employment to many people normally unable to obtain work in their place of residence.



Australia

DEVELOPS PELAGIC FISHING: Fishermen at Eden, New South Wales, Australia, and a small Sydney fishing company are pioneering what may become a major development of the state's fishing industry, according to the Canadian periodical, Foreign Trade, of May 14. This is the capture, in commercial quantities, of pelagic fish (sardines, mackerel, sprats, anchovies, and tuna). It is reported that this type of fishing could supply all the canned fish Australia needs and provide a basis for lucrative export industry.

Tuna exports might become one of Australia's substantial dollar earners. The trade in frozen and canned tuna could rise to more than 28,000,000 annually, and it is probable that the first big consignment of tuna will leave Australia in 1949.

The frozen and canned crayfish industry of Western Australia is currently earning one million American dollars per annum and is operated principally by the two floating plants which proceed around the Western Australian coast, going from one crayfish area to another.

PEARLING AND OYSTER CULTURE BEING STUDIED: The Australian pearling industry is rapidly expanding, but fishing facilities are improving only slowly. Late this

year, a 75-foot vessel left Sydney for Thursday Island, Torres Strait, to study the pearl-shell oyster and to begin the first Australian experiments with the cultured pearl.

At present, the pearl oyster is not cultivated in Australian waters as is the edible oyster in New South Wales. Scientists will develop their own oyster beds, adopting the Japanese method of growing the oyster on wire suspended from floating rafts. They will also study the oysters in their natural beds—their distribution, growth rate, how they breed, how to crop them, and how to conserve them.

Japan is the inspiration of another major Australian oyster experiment. This is with the Pacific oyster, a large edible variety suitable for smoking and canning. Scientists hope it will grow and breed successfully in the colder southern waters.



Belgium

FOREIGN TRADE IN FISHERY PRODUCTS, 1948: During the first half of 1948, Belgium imports of fish were maintained pretty much at previous levels, while fish exports dropped vertically, according to an April 29 report from the American Embassy at Brussels. The result was a sharp drop in prices to the Belgian producers. Because of the crisis in the Belgian fishing industry, Belgian fish imports were restricted in the second half of 1948. The difficulties of the fish industry were due to the fact that other countries, particularly France and the United Kingdom, were restricting their fish imports from Belgium. Recently, exports to the United Kingdom have been resumed.

FISHING FLEET: At the end of 1948, the Belgian fishing fleet consisted of 481 units as compared with 510 units just before the war. The average size of the ships is larger now than before the war so that the total tonnage at the end of 1948 was 29,938 metric tons as compared with 28,037 tons before the war. The fleet has been modernized and now has more power and more fishing capacity than ever before in Belgian history.

The Belgian Government owns five large fishing boats of which four have been rented to three Ostend businessmen at \$2,662 per boat per month. Two of the renters have not made any payment, and it is reported that the third is not making money and will follow the example of the other two. The Libre Belgique says that it is hoped that the Government will sell these boats.

TRADE AGREEMENTS: A supplementary agreement was signed between Belgium and Trizone Germany on January 12, 1949. This agreement provided for exports from Belgium of the following amounts of fish:

<u>Item</u>	<u>Value</u>
Fresh sea fish	\$325,000
Fresh and salted herrings	300,000
Other salted fish (sardellen)	110,000

A trade agreement has been signed between the Belgo-Luxembourg Economic Union and Portugal, for the period January 1 through December 31, 1949. This agreement

provides for exports from Portugal of \$182,000 worth of sardines in oil and other sauces.

NOTE: Values converted on basis of one Belgian franc equals 2.275 cents U. S.



Bizone Germany

LIFTING OF BERLIN BLOCKADE AIDS FISHERIES: The opening of zonal borders to goods traffic has averted the crisis in the German fish industry by creating additional markets in Berlin and (through unofficial channels) in the Russian Zone, according to a May 24 report from the American Consulate at Bremerhaven. In the week May 16-23, fish prices ex-vessel showed increases ranging up to 25 percent.

Before the blockade began, West Berlin consumed some 1,000 metric tons of fresh fish monthly, of which 700 tons were supplied by rail from Bremerhaven. For the next few months, Berlin is expected to consume almost 3,000 tons monthly, of which 1,000 tons will be drawn from Bremerhaven and will be delivered by truck. The increased consumption is attributed to the ending of fish rationing in Berlin and to the fact that Berliners have been without fresh sea fish for almost a year.



Canada

ARCTIC FISHERY INVESTIGATION MAY BE EXTENDED: The investigation of fisheries in Canada's Eastern Arctic waters (began in 1947 in Ungava Bay) by the Calanus, the boat of the Fisheries Research Board of Canada, may be expanded to include the whole Eastern Arctic area, which covers all the waters of Hudson Bay, Hudson Strait, Foxe Basin and Ungava Bay, and the waters from Belle Isle north to Baffin Bay and the polar area. During its general investigation of the physical and biological oceanography of Eastern Arctic waters, the research party will look for marine resources for use by the Eskimo population, according to the July 1949 Canadian Fisheries Department Trade News.

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LOBSTER CANNING REGULATIONS CHANGED: Lobster canning in Canada is now allowed all year round on the Atlantic Coast as a result of a recent order-in-council which amends the regulations under the Meat and Canned Foods Act, according to the May 1949 Trade News of the Canadian Fisheries Department.

During the past number of years there has been a growing chilled lobster meat industry which has been allowed to put up fresh lobster meat in "slip-on" cover cans. These friction-top cans are not hermetically sealed as required under the canning regulations of the Meat and Canned Food Act, and thus this industry was able to put up the chilled lobster all year. The canning of hermetically sealed lobster, however, was allowed only when the lobster fishing season was open in each area. Now canning is allowed at any time of the year.

* * * * *

PACKING CANADIAN "SPRING BLOATERS" FOR EXPORT: In order that Canadian exporters may ship a larger size spring herring outside Canada, the Canadian De-

partment of Fisheries has announced that an 18-pound box of "spring bloaters" packed in 1949 for export may contain not less than 60 and not more than 80 fish, according to that agency's July 1949 Trade News.

This order is an exception, for the 1949 pack only, to the regulations which provide that each 18-pound box of "spring bloaters" packed for export shall contain not less than 80 and not more than 120 fish.

This new regulation was put into force when it was found that some waste was occurring when packers could not keep within the 80 to 120 count without culling out larger fish.

TEST OF REFRIGERATOR CAR SUCCESSFUL: The Halifax, N. S., to Vancouver, B. C., test run of the Canadian mechanically refrigerated railway car of the Pacific Experimental Station, Fisheries Research Board of Canada, was completed successfully on July 18, according to the July 1949 Canadian Fisheries Department Trade News.

The shipment consisted of 34,000 pounds of mixed smoked haddock, cod, and kippers, and some scallops, and was consigned to a West Coast distributor. The temperatures inside the car ranged from -2° to -6.5° F. During its 3,000-mile run, the car was exposed to outside temperatures of 109° F. in the sun and 92° F. in the shade. The test demonstrated the car's practicability in keeping fish at a high quality level by maintaining low temperatures over long distances.

A similar successful test run was made in June from Prince Rupert, B. C., to Montreal, Que.



France

IMPORT DUTIES RESTORED ON CERTAIN FISHERY PRODUCTS: Import duties (suspended since July 8, 1944) have been restored in France on an extensive list of products, including certain fishery products, by an order of June 3, 1949, published in the French Journal Officiel and effective June 4, 1949, according to an American consular report.

The following are the fishery products on which import duties have been re-stored at the rates listed in the present French import tariff (French tariff item numbers in parentheses):

Fresh sea-fish (24)

Fish, simply salted, dried, or smoked except cod, including klippfish and halibut in fillets (25 A, ex 25 B, 25 C and E)

Mussels (ex 27 A)

Prepared or preserved fish (164)

Duties on the following fishery products (suspended since July 8, 1944) have been re-established at rates lower than those listed in the present French import tariff:

Cod, including klippfish and halibut in fillets, 35 percent (listed rate 70 percent) (ex 25 B)

French Morocco

FISHERIES REVIEW, 1948: Fishing Fleet: The fishing fleet in French Morocco, during 1948, consisted of 1,140 vessels for line fishing, 216 sardine-fishing boats, 53 trawlers (net fishing), and 31 sardine trawlers, according to an April 25 American consular report from Casablanca.

French Moroccan Fish Catch, 1948, By Ports	
Port	Quantity lbs.
Safi	54,379,745
Agadir.....	26,717,810
Casablanca	25,615,135
Mogadar	5,178,690
Port-Lyautey ...	4,429,915
Fedala	3,938,963
Rabat	1,600,225
Mazagan	1,203,382
Total	123,063,865

Fish Canning: Morocco had 116 fish canneries. If tin plate and oil and fat supplies were sufficient, it is estimated that the present fish canning equipment of Morocco would permit the annual production of 2 million cases of canned fish.

Exports: Exports of fishery products to the United States during 1948 consisted of 479,123 pounds of canned sardines, valued at \$156,234; and 1,092,582 pounds of other fishery products, valued at \$49,739.



Hungary

STATUS OF FISHERIES: Hungary's total yearly fish production was 15,432,200 pounds before the war, compared with 8,818,400 pounds at present, according to a June 17 report from the American Legation at Budapest, which quotes the Hungarian newspaper Kris Ujsag of June 14, 1949.

While the total yield of Hungarian fish ponds in 1945 was only 881,840 pounds, it grew to 1,763,680 pounds in 1946, and to 3,086,440 pounds in 1947. The estimate for this year is 5,070,580 pounds.

The fish stock of Hungary was reduced to a large extent during the War, but immediately after the end of the War reconstruction also began in this field.

Before the War about 50 percent of Hungarian fish production was taken over by the neighboring countries. While export possibilities are not so favorable at present, the demand for live carp on the home market has increased notably this year.

The improvement of the fish stock of Hungary's natural waters is also said to be taking place, but it cannot be controlled as well as in the case of fish ponds. Last year's total yield of lake Balaton, with an amount of over 2,645,520 pounds, exceeded the average of several previous years. The quality of free-water fish, however, is not yet quite satisfactory. For this reason it is the intention of the authorities to improve the quality of the fish stock of the rivers and lake Balaton.

The administrative system of Hungary's pisciculture has recently been reorganized. The present administrative system consists of the National Bureau for Fish and Reed Economy, and four national enterprises.



Iceland

SUMMER HERRING FISHERY: The summer herring fishery is operated off the north coast of Iceland during the summer months (July, August, and the first part of September), according to a July 6 report from the American Legation at Reykjavik. The State Herring Board determines the price of herring to be paid to the fishermen. The price of fresh herring to be delivered by Icelandic fishermen to the factories for processing into oil and meal was placed at 2 cents a pound, 1/10 of a cent lower than that paid last summer (1948). The price for salted herring (eviscerated, with head off) was established at \$9.22 per barrel. The price is the same as paid in 1948.

To date, approximately 200 Icelandic vessels have left their home ports to participate in the North Coast herring fisheries. The press as well as the Fishing Association of Iceland reported that approximately 400 foreign vessels have arrived to take part in the herring fisheries. Among the foreign vessels are Norwegian (350), Swedish (90), Danish, Finnish, German, and Russian ships.

The Icelanders are hoping for a very fruitful summer herring season. The past four summers have been virtual failures and have driven many of the fishing vessel owners into a dangerous financial position. The Government has been compelled to aid the fishing fleet in order to keep it in operation.



Iraq

RECEIVES MODERN TRAWLER: A motor trawler, Zubaida, ordered some time ago by the Agricultural and Industrial Bank in Iraq has now been launched in England. It is expected to arrive in Basra at the end of the summer, according to a May 5 report from the American consulate at Basra.

The trawler has a length of 90 feet, a beam of 20 feet, displaces 200 tons, a fish hold with a capacity of 3,500 cubic feet, a refrigerating plant capable of maintaining a temperature of 32° F. in Iraqi waters, and a range of 1,500 miles.

The trawler will be operated by the Basra Port Directorate for the account of the Iraqi Ministry of Agriculture. It will be manned by British officers and an Iraqi crew and will be based at the Port's dredger depot at Fao, at the mouth of the Shatt-al-Arab. The Port Directorate has undertaken to construct a small cold-storage plant at Fao to preserve the fish, and construction was started in June.

Fish will be transported to Basra by truck, part of the supply to be allocated to the Basra and Southern Iraq market and the remainder shipped by train to Baghdad. At the request of the Ministry of Agriculture and with the fish traffic in mind, the Port Directorate last year undertook the paving of the Fao road.

The arrival of the Zubaida and consequent introduction in the Persian Gulf of modern fishing methods should be of great benefit to the Iraqi populace and should strengthen the economic base of the nation.



Japan

1948-49 ANTARTIC WHALING EXPEDITION: Production: The 1948-49 Japanese Antarctic whaling expedition took a total of 1,138 blue whale units (1,645 whales), from which 54,500 metric tons of products were obtained. About 20,000 metric tons of this total were whale oil, and the remainder was blubber, meat, and miscellaneous products. The 1947-48 Antarctic whaling expedition took 1,014 blue whale units and realized about 47,000 metric tons of products, 17,000 metric tons of which were whale oil, according to various reports received from the Natural Resources Section of SCAP.

Whaling Expedition Commended: A representative of the Natural Resources Section, in an address given at a celebration of the return of the Japanese Antarctic whaling fleet, stated in part:

"We are here today to help you celebrate completion of the most notable Antarctic whaling expedition ever carried out by a Japanese fleet. Your performance on this expedition has been exceptional in many respects. I wish to comment particularly on those features which are of special significance to Japan's international position.

"Before World War II, Japanese whaling fleets operated with almost complete disregard for the regulations drawn up by the International Whaling Convention to protect the Antarctic whale herds from extinction. Nearly one-quarter of their catch was taken in violation of protective regulations established by this Convention.

"During the past three seasons, you have demonstrated that you can, and will, carry on whaling operations according to international agreements and with due regard for the preservation of the whale resources.

"You have set a magnificent example for the entire Japanese fishing industry by obtaining maximum production and utilization of aquatic products while observing all national and international regulations."

1948 JAPANESE AGAR AGAR PRODUCTION: The Japanese Ministry of Agriculture and Forestry reported that exports of agar-agar during the 1948 calendar year totaled 1,019,014 pounds.

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FISHERIES COOPERATIVES: Introduction: Cooperation of fishermen for the purpose of mutual assistance is an old movement in Japan, according to Preliminary Study No. 31 "Fisheries Cooperatives of Japan" of SCAP's Natural Resources Section issued in January 1949. As early as 1500 A. D. organizations were formed to build, cooperatively, landing docks, markers and beacons, as well as other facilities which were needed, but which could not be provided on an individual basis. The fishery cooperative associations became especially strong during the Meiji Era, 1868-1912, when practically autonomous power in fishing management was granted to them. Since about 1900, the cooperative associations began business activities such as selling the members' catch and purchasing material for their members. By 1933, there existed 3,778 cooperatives with a membership of 691,185 and 46 federations which established a link among the local cooperatives.

The Fisheries Organization Law of 1943 gave the central Government of Japan complete control of the entire coastal industry including the cooperatives. The law stipulated that "those who do fisheries and owners of fishery rights and who

lease fishery rights and do fisheries by virtue of same in the locality, also those who have close relations with the fisheries operated by the members, may be made members" of the respective cooperative. In actual practice, this law created for the cooperative in each village a monopolistic position and it gave to the directors of the cooperative exclusive power over fishermen. Denial of membership in the cooperative was equivalent to the denial of the right to fish. The new fisheries cooperative legislation of 1948 attempts to break up the monopolistic position of the old cooperative. In the future, any 7 fishermen may establish a production cooperative. The boundaries of these cooperatives may be overlapping. The cooperatives may compete each against the other.

General Provisions of the Fisheries Cooperative Legislation, 1948: The fisheries cooperative legislation enacted on November 27, 1948, by the Japanese Diet is composed of two separate laws. The Law Concerning the Consolidation of Fisheries Organizations or the Like in Compliance with the Enforcement of Fisheries Cooperative Association Law abrogates the Fisheries Organization Law (Law No. 27 of 1943) and provides for the dissolution of all fishing associations and manufacturers' associations organized in compliance with it. The Fisheries Cooperative Association Law authorizes the formation of fisheries cooperatives and establishes the legal basis on which they will be organized and operated.

The administrative authorities referred to in the law are the Minister of Agriculture and Forestry or the prefectural governor, as may be appropriate in the specific instance.

The effective date of both laws has been set by Cabinet Order as February 15, 1949.

Summary of 1948 Fisheries Cooperative Association Law:

SUMMARY OF FISHERIES COOPERATIVE ASSOCIATION LAW

The purpose of the Fisheries Cooperative Association Law is "advancement of the national economy by increasing fisheries productivity and improving the economic and social status of fishermen and marine products processors through the development of fisheries cooperative associations." The objective of each cooperative will be "to furnish direct service for the benefit of its membership consistent with the functions which it is authorized to perform."

The law authorizes three types of cooperatives and two kinds of federations:

- a. Fishermen's Cooperative Assns.
- b. Fishermen's Production Cooperative Assns.
- c. Federation of Fishermen's Cooperative Assns.
- d. Marine Products Processing Cooperative Assns.
- e. Federation of Marine Products Processing Cooperative Assns.

"Fisheries" is defined in the law as "a business to carry on gathering, taking, or culturing of marine animals and plants." "Marine products processing" is defined as "a business to carry on manufacturing food stuff, feed stuff¹, fertilizer, paste, oil, or hide with marine animals and plants as their raw materials or stuffs." "Fishermen" are defined as "individuals who operate fisheries and employees who engage in gathering, taking, or culturing of marine animals or plants on behalf of fisheries operators." "Marine products processors" are defined as "individuals who operate marine products processing."

¹/Feed stuff means livestock feed.

²/This is a departure from established tradition in Japan. In the past, only those who owned boats or nets or held fishing rights were considered fishermen.

The law makes the following provisions for the various types of associations and federations:

a. Fishermen's Cooperative Associations

(1) Business: Fisheries cooperative associations may engage in one or more of the following functions:

- (a) Giving credit to members.
- (b) Accepting deposits of members.
- (c) Purchasing or selling goods cooperatively for business and family needs.
- (d) Operating common facilities needed for business and family use of members.
- (e) Transporting, processing, storing, or selling products of members.
- (f) Participating in activities contributing to conservation and propagation of marine animals and plants and exploitation of fishing grounds.
- (g) Establishing facilities such as docks, breakwaters, etc.
- (h) Offering disaster relief and life saving activities for its members.
- (i) Offering welfare and educational activities.
- (j) Bargaining collectively on behalf of members.
- (k) Participating in collateral activities required to accomplish any of the preceding items.

Cooperatives without capital stock cannot perform credit or deposit functions. Cooperatives may make their facilities available to non-members. However, this must be set forth in the articles of incorporation, and the

total volume of business with non-members cannot exceed that done with members. A fishermen's cooperative may operate fisheries in addition to the above functions, provided that:

- (a) Two-thirds of the fishermen's households of the area are represented in its membership.
- (b) A majority of its members are engaged in the fisheries operated by the cooperative.
- (c) The organization is a capitalized cooperative.
- (d) No member holds more than double the average number of shares per member.
- (e) A majority of the shares in the cooperative are held by members engaged in the fishery or fisheries operated by the cooperative.
- (f) Two-thirds or more of the persons engaged in the fisheries operated by the cooperative are members or reside in the home of members of the cooperative.

(2) **Membership:** Membership in fishermen's cooperatives is open to any fisherman residing in the area covered by the association who engages in fisheries a minimum of 30 to 90 days a year. The articles of incorporation of each cooperative must designate the exact number of days, not less than 30 or more than 90. The articles of incorporation of cooperatives whose area of operation is larger than one city, town, or village may limit membership to fishermen engaging in one specific type of fishery. Associate membership may be granted to marine product processors residing in the area of the cooperative who are not members of a marine products processing cooperative and to any fishermen's production cooperative or individual fishermen ineligible for full membership. Associate members do not have the right to vote but have all other membership privileges. No applicant for membership can be refused membership without due cause, and no special conditions for membership can be imposed on any applicant.

(3) **Capitalization:** The capitalization requirements (number and value of shares) for members will be determined by the articles of incorporation. All units of capitalization (share) will be of equal value. Each member of a capitalized fishermen's cooperative will possess one or more units of capitalization. The liability of a member will be limited to the amount of his investments. Shares cannot be held jointly by members, cannot be transferred without the consent of the cooperative, and cannot be owned by persons other than members or associate members.

(4) **Elections and General Voting:** Each member will be entitled to one vote. Voting by written proxy on previously publicized matters is authorized. No member can vote more than one proxy. Elections will be by secret ballot. One-fifth of the members may institute recall proceedings by means of a petition. All directors will be voted upon in a recall election.

(5) **Secession and Expulsion:** Members can secede from a cooperative at the end of any business year, if prior notice is given. The time of this notice will be determined by the articles of incorporation; however, it shall not be less than 60 days nor more than one year. Members may be expelled from a cooperative by resolution of the general meeting for the following reasons:

- (a) Failure to utilize the facilities of the cooperative for "an unreasonably long period of time."
- (b) Refusal to fulfill their obligations such as "payment of investments and assessments, etc."
- (c) Violation of the articles of incorporation.

(6) **Officers:** Cooperatives will have a minimum of five directors and two auditors. Three-fourths of the directors must be members of the cooperative. The normal term of office will be one year; however, the articles of incorporation may establish two-year terms.

(7) **Reserve Fund and Distribution of Profits:** At the close of each business year the cooperative will set aside a reserve fund of one-tenth or more of the surplus funds, until this reserve fund reaches the amount prescribed in the articles of incorporation. The amount of the reserve fund prescribed in the articles of incorporation shall not be less than one-half the total amount of the capitalized stock of the cooperative. This reserve fund can be used only for the payment of losses. Cooperatives must set aside five percent or more of each year's surplus fund for conducting educational activities. After payment of losses, the reserve fund and the educational fund will be set aside, the remaining surplus will be distributed by paying a dividend not exceeding five percent on the units of capitalization, and any remainder will be distributed to the members in proportion to the extent they used the facilities of the cooperative during the business years.

(8) **Organization:** Geographical boundaries for the area of the cooperative's function will be determined by the articles of incorporation. Twenty or more fishermen are required to organize a fishermen's cooperative. Steps in organizing fishermen's cooperatives are:

- (a) Twenty or more fishermen must act as promoters.
- (b) The promoters will prepare a program showing the scope of business, area of functions, and qualifications for membership of the proposed cooperative.
- (c) The promoters will hold a preliminary meeting for organization. A public notice giving the date and place of the meeting must be given two weeks before the meeting.
- (d) At the preliminary meeting at least 20 fishermen will be selected from among those present to draft the articles of incorporation. All decisions made at the preliminary meeting will require the consent of the majority of the fishermen present.
- (e) Upon completion of the draft of the articles of incorporation by the drafters the promoters will hold a constituent general meeting. At least two weeks before the meeting a public notice of the draft of the articles of incorporation and the time and place of the meeting must be given. Approval of the articles of incorporation, adoption of a business plan, and other matters necessary for organization will be carried out at the constituent meeting. The draft of the articles of incorporation may be amended at the constituent meeting; however, this does not apply to the provisions regarding the area and qualifications for membership.
- (f) Immediately after the constituent general meeting, the promoters must apply to the administrative authorities for approval of the organization.
- (g) The administrative authorities must approve the application unless the organization is contrary to the Fisheries Cooperative Law.
- (h) If notification is not received from the administrative authorities within two months after date of application, the formation of the cooperative is approved automatically.
- (i) Upon approval by the administrative authorities, the promoters must surrender their duties to the directors. The directors must then collect the payment of the first quota of the capitalization from the members.
- (j) The cooperative becomes established upon registration at the location of its principal office.

b. Fishermen's production cooperative associations

- (1) **Business:** Operation of fishing enterprise.

(2) Membership: The qualifications for membership will be determined by the articles of incorporation. However, all members must be fishermen. Two-thirds of the members must be engaged in the fishing enterprise operated by the cooperative, and two-thirds or more of the persons engaged in the fishing enterprise operated by the cooperative must be members of the cooperative.

(3) Capitalization: Each member of a cooperative must possess one or more units of capitalization (shares). The number of units owned by any one member must not be more than twice the average number of units held by other members. The majority of the total units of capitalization of the cooperative must be possessed by persons engaged in the fisheries operated by the cooperative.

(4) Officers: Fishermen's production cooperatives must have three or more directors, all of whom must be members of the cooperative. A recall election of the officers may be initiated by a petition of one-third of the members.

(5) Organization: Seven or more promoters may form a fishermen's production cooperative.

(6) Surplus Fund: A production cooperative may pay 10 percent dividend on its stock. The remainder is distributed on the basis of labor contributed to the cooperative enterprise.

(7) All other provisions applying to fishermen's cooperative associations apply with modifications to fishermen's production cooperatives.

c. Federations of Fishermen's Cooperative Associations

(1) Business: Federations of fishermen's cooperative associations may, with necessary modifications, perform any of the business functions conducted by their member cooperatives. However, federations carrying on the functions of credit and accepting deposits may not carry on other activities. The business of credit of the acceptance of members' deposits may not be carried on by non-capitalized federations.

(2) Membership: Membership of federations shall be drawn from the following, as determined by the articles of incorporation:

- (a) Fishermen's cooperatives or federations having as their jurisdictional area the whole or part of the area in which the federation is to operate.
- (b) Fishermen's production cooperatives which have their official address in the jurisdictional area of the federation.
- (c) Any cooperative organization situated in the jurisdictional area of the proposed federation and authorized by other laws to perform functions similar to those performed by the cooperatives mentioned in the preceding two items.

(3) Limitations: Federations shall be limited in size by either of the following items:

- (a) The jurisdictional area of a federation must not be larger than one prefecture.
- (b) The number of cooperatives constituting the membership of a federation must not exceed 300.

(4) Organization: Two or more cooperatives may become the promoters of a federation.

d. Marine Products Processing Cooperative Association

(1) Business: Marine products processing cooperative associations may engage in any or all of the following functions:

- (a) Giving credit to members.
- (b) Accepting deposits of members.
- (c) Purchasing or selling goods cooperatively for business needs of members.
- (d) Operating common facilities needed for business purposes of its members.
- (e) Transporting, processing, storing, or selling products of members.
- (f) Inspecting products manufactured by members.
- (g) Offering welfare and educational activities.
- (h) Participating in collateral activities required to accomplish any of the preceding items.

The cooperative may, in accordance with the articles of incorporation, make its facilities available to non-members; however, this business with non-members must not exceed one-fifth of the total volume of the business of the cooperative. Cooperatives carrying on the functions of lending and accepting deposits may not conduct other activities.

(2) Membership: The qualifications for membership will be determined by the articles of incorporation; however, all members must be marine products processors.

(3) Organization: The organization of a marine products processing cooperative requires 15 marine products processors as promoters.

(4) All other provisions applying to fishermen's cooperative associations are applied to marine products processing cooperatives with the necessary modifications.

e. Federations of Marine Products Processing Cooperatives

(1) Business: Any of the activities performed by the member cooperatives may, with necessary modifications, be performed by the federation. However, federations performing credit and deposit functions cannot conduct other activities.

(2) Membership: The membership of federations will be drawn from the following as determined by the articles of incorporation:

- (a) Cooperatives or federations having all or part of the jurisdictional area of the federation being formed as their area of operations.
- (b) Any cooperative organizations within the jurisdictional area of the proposed federations and authorized by other laws to perform functions similar to those performed by the cooperatives mentioned in item (a).

(3) Organization: Two or more associations may become promoters of a federation.



Liberia

POSSIBILITIES OF THE FISHERIES: Fishing as an industry has not yet been developed in Liberia. The possibilities for such a venture seem excellent, for the present supply of fish comes from native fishermen who go out nearly every day in dugout canoes and return at the close of the day with a few fish, according to a March 10 report from the U. S. Economic Mission to Liberia. These are immediately taken up by customers who flock to the water's edge and who even wade out into the water to meet the canoes. The supply available does not even begin to satisfy the demands of the consumers.

There is a variety of fish in the waters of Liberia, which should, and could, supply the needs of the country. Among the fish and shellfish to be found are herring, mullet, red snapper, gripper, barracuda, tarpon, crabs, lobsters, crawfish and a few other kinds.

Native-made drag seines are used in the coastal waters of Liberia. In the fresh-water streams and lakes, traps and small nets are used. Purse seines are unknown. To help meet the demand for low-cost protein food, large amounts of canned and dried fish are imported.

One or two fishing boats, equipped with icing facilities and working with a fleet of canoes should be able to greatly increase the local take of fish for which a ready market exists.



Morocco

DANISH FISHING VESSELS TO OPERATE IN MOROCCAN WATERS: Negotiations are being conducted between the authorities of Morocco and private fishing interests in Denmark to operate Danish fishing vessels in Moroccan waters, according to a May 23 report from the American Embassy at Copenhagen.

It is expected that Danish fishing vessels will conduct experimental fishing in Moroccan waters in search of tuna, sardines, hake, and sole. Catches will be sold to canneries in Morocco which at present cannot be kept in continuous production due to the irregular catches of the local fishing fleets. If proposed operations prove successful and catches are adequate, a Danish export fish business may be established in Morocco eventually.

All proposed operations will be under Danish management. Two Danish vessels (39 and 49 gross registered metric tons, respectively) have been selected for the initial trial. Both ships, built in Denmark will be equipped with latest gear and equipment, including refrigeration plants, moored nets, floating trawls, and Danish seines. It is expected that these vessels will be followed by others at a later date.



New Caledonia and Dependencies

FISHERIES: Waters and reefs around New Caledonia contain an abundance of many varieties of fish, crustaceans, and mollusks, and there are thousands of

turtles in the area of the Huon Islands. The fishing industry in general, however, has been developed only sufficiently to supply the local market with fresh and dried fish, according to a May 1949 report from the International Reference Service of the Department of Commerce.

The one sea product shipped from the colony in significant quantities is the trochus shell, and the New Caledonia variety is considered among the finest obtainable anywhere. Searching for shells was prohibited during the war but was resumed in 1946. In that year exports amounted to 1,220 metric tons, compared with an average of 524 tons a year from 1932 to 1939. Shipments went mainly to France. Considerable activity is anticipated in this field.



Newfoundland

SEAL FISHERY, 1949: The total seal fishery of vessels based on Newfoundland for the 1949 season was considerably more successful than in 1948 and much more so from the viewpoint of Newfoundlanders, according to a June 15 report from the American Consulate General at St. John's.

The total number of seals caught by vessels of Newfoundland registry increased by 69.5 percent, the gross weight by 57.4 percent, and the net value by no less than 112.7 percent (see table).

Seal Fisheries Based on Newfoundland, 1948 and 1949 Seasons						
Vessel Registry	1 9 4 9			1 9 4 8		
	Seals Caught	Gross Weight of Seals Caught	Net Value of Seals	Seals Caught	Gross Weight of Seals Caught	Net Value of Seals
	No.	Lbs.	U.S.\$	No.	Lbs.	U.S.\$
Vessels of Newfoundland registry	130,625	6,688,156	476,805.58	77,012	4,249,554	224,203.73
Vessels of other registry	4,821	345,965	13,294.97	64,959	3,453,186	173,816.63
Total	135,446	6,924,121	489,805.55	141,971	7,702,740	398,020.36

In 1948, there were eight sealing vessels of foreign registry, either Canadian or United States, based on Newfoundland but in 1949 there were only two, both Canadian. In addition, there were a number of Norwegian vessels, estimated at nine by the Newfoundland Fisheries Board, operating in and around Newfoundland waters, but the details of this catch are not known.

Prices remained the same as last year, \$10.00 for young harps, \$5.00 for old harps, \$12.00 for young hoods, \$5.00 for old hoods, and \$6.00 for bedlamers. The great rise in the value of the catch was due primarily to the greatly increased number of young harps caught, the total figure rising from 69,574 in 1948, to 103,280 in 1949.

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WHALE AND FISH OILS, 1948: Production: The production of cod oil in Newfoundland declined and that of herring oil increased in 1948, according to an April 13 report from the American Consulate General at St. John's.

The production of seal oil also fell sharply, as was to be expected from the decline in the catch by vessels of Newfoundland registry.

The most striking increase was in whale oil. The production of whale oil in Newfoundland in 1948 reached an all time high of 1,476,770 gallons, an increase of almost 60 percent over the preceding year, which was also a record year.

Consumption and Exports: Virtually the entire production of fish oils in Newfoundland is exported, the volume of home consumption being unimportant.

Wholesale Prices: Wholesale prices on whale and seal oils during 1948 as quoted by local dealers were \$440.00 per metric ton c.i.f. European ports in bulk and \$515.00 per ton c.i.f. European ports in packages.

Pure common cod oil remained between 20 cents and 21 cents per pound c.i.f. New York.

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Table 1 - Newfoundland's Production of Whales & Whale Oil, 1941-48

Year	Whales Caught	Oil Produced
	No.	Gals.
1948	756	1,476,770
1947	455	927,343
1946	529	913,139
1945	393	621,300
1944	264	456,649
1943	152	296,448
1942	72	105,264
1941	72	89,040

Table 2 - Newfoundland's Exports of Fish Oils, 1947-48

Type of Oil	1948		1947	
	Gals.	Value	Gals.	Value
Common cod	303,535	\$ 436,074	714,799	\$1,015,595
Refined cod	257,131	507,455	415,622	796,466
Poultry	11,680	18,930	5,633	11,680
Sperm	31,570	31,949	61,422	98,187
Other whale	792,433	1,146,093	1,153,568	1,595,907
Herring	152,558	197,370	42,299	61,703
Seal	250,096	436,030	498,247	761,207
Bream (Rosefish) ..	2,316	1,776	1,488	1,141
Bream "				
viscera	10,558	32,385	-	-
Squid	56	38	-	-
Shark	54	63	-	-
Total	1,811,987	\$2,808,163	2,893,078	\$4,341,886

Table 3 - Principal Importers of Newfoundland Fish Oils, 1947-48

Country	1948		1947
	Gals.	Value	Gals.
United States	511,205	\$828,637	774,862
Belgium	10,056	17,024	20,335
Canada	350,847	612,047	1,925,362
Denmark	14,519	14,519	-
France	149,077	257,174	2,287
Germany	680,752	964,114	-
Italy	27,600	60,900	-
Switzerland	8,316	10,746	108,176
United Kingdom	7	32	48,569

Note: In addition, during 1948, 35,785 pounds of cod stearine, valued at \$4,940, were imported by the United States, and 515 pounds of seal stearine, valued at \$618, by Canada.

Cod liver oil of medicinal grade averaged about \$2.50 per gallon c.i.f. New York while poultry oil averaged about \$2.08 per gallon.

Current Market Situation: The current market for fish oils is somewhat depressed as compared with last year. Cod liver oil, whose price is determined primarily by the Norwegian price, is off somewhat and there have been no sales of cod oil since December 1948, owing to the fact that the tanneries in the United States are working only part time and still have a carryover of cod oil from 1948. The market for whale oil is also depressed owing to the decrease in demand from Europe.

Table 4 - Stocks of Fish Oils on Hand in Newfoundland on January 3, 1949

Type of Oil	Quantity on Hand
	Short Tons
Whale oil, No. 3	559
" " , No. 4	76
Seal oil, No. 1	1,000
" " , No. 2	50
Cod oil	1,000
Cod liver oil	110
Herring oil	-

Outlook for 1949: Exporters have adopted a rather cautious outlook toward prospects for 1949. It is hoped that the market for common cod oil will become more active in about six weeks when current stocks in the United States have declined, but it is ex-

pected that prices will be lower. It is also expected that prices for cod liver oil and whale oil will fall somewhat.



Nigeria

STATUS OF FISHERIES, 1948: Efforts have been made to improve the fish industry because of its importance as a supply of food. Fish are now imported, and the country hopes to become self-sufficient in this respect, according to a March 18 report from the American Consulate General at Lagos. Some two years have been spent in training and educating Nigerians in the use of large-mesh nets for catching large fish and to impress upon them the importance of not removing small, immature fish from the waters. There are plans for enacting legislation forbidding the catching of immature fish. Encouragement has also been given to deep-sea fishing in the hope of giving the waterways some respite.

The one-year training offered by the Fisheries Department is free and consists of demonstrating improved methods and offering technical advice and assistance.

The present yield of Nigeria's waters, both inland and oceanic, is inadequate for her own needs. There is no possibility of exporting any fish, but through this training, it is hoped production may be increased to fulfill the country's needs. It is estimated that there are only 12,000 square miles of fishing ground along the coast and about 1,000 square miles along the waterways. The total annual catch from these sources should eventually be from 80,000 to 90,000 tons. Between 3,000 tons and 4,000 tons are now imported, most of which are dried fish.

On the basis of 80,000 to 90,000 tons a year for domestic consumption, there should be about six pounds of fish per adult which still leaves a large deficiency on the protein diet of the average Nigerian.

Trial ponds are now in the making for breeding fish, but these are too new to judge results as yet. Food for these ponds is being produced from palm kernel residue.

Production of commercial fish byproducts is also being encouraged; and the marketing of shark liver and fish swim bladder (for use in beer and wine cleansing and the manufacturing of glue) is proving profitable. Mangrove cutch is also being produced for tanning nets.

There are also experiments under way for the canning of fish in a newly erected experimental cannery near Lagos.

NOTE: Quantities in metric tons.



Norway

DANISH-NORWEGIAN TRADE AGREEMENT SIGNED: Negotiations between Danish and Norwegian trade delegations resulted in the drafting, on April 1, 1949, of a trade agreement for the period April 1, 1949-March 31, 1950. The agreement has been approved by the Danish and Norwegian Governments and was signed at Oslo on April 13, 1949, according to a May 23 report from Copenhagen.

Included among the Danish imports are the following Norwegian fisheries products:

Salted herring -	\$303,030	Oyster brood -	\$20,202
Fresh fish -	40,404	Fish glue -	10,101
Canned fish -	60,606	Crude whale oil -	9,500 M.T.
Shellfish -	80,808	Hardened whale oil -	2,500 M.T.

Included among the Norwegian imports are the following Danish fisheries products:

Fresh and live fish -	\$104,188
Fish products -	41,675

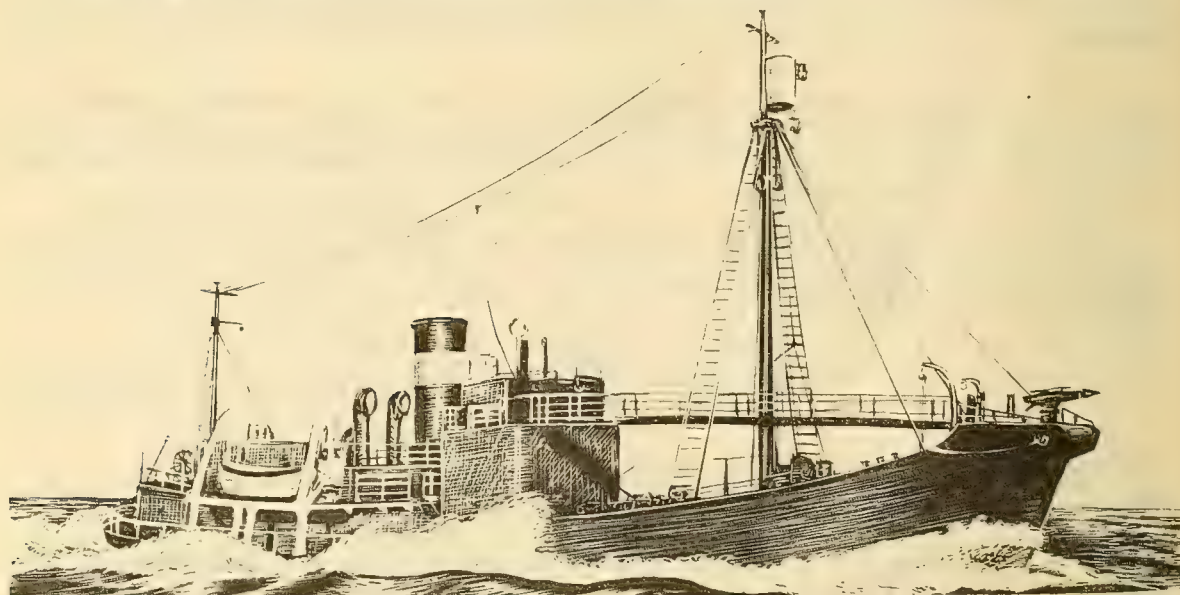
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NORWEGIAN-BRITISH TRAWLING DISPUTE: On Friday, July 15th, the Norwegian Government forwarded a memorandum to the British Government concerning a recent disagreement over territorial limits off the Norwegian coast, according to a July 23 report from the Norwegian Information Service. The disagreement arose early in May when the British trawler was detained by Norwegian authorities on the charge that it was fishing within the four-mile limit which Norway regards as its territorial boundary. A British protest was forwarded immediately, noting that the vessel was fishing outside the three-mile line which Britain regards as the limit of a country's territorial waters.

A Norwegian spokesman in London noted recently that it would be of the utmost importance were a Norwegian-British agreement reached. It could aid in setting a precedent for other countries which presently fail to agree on this same question.

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PRODUCTION OF 1948-49 ANTARCTIC WHALING EXPEDITION: The total production of the ten Norwegian whaling expeditions, which have been operating in the Antarctic



TYPE OF MODERN CATCHER BOAT USED BY NORWEGIANS DURING THE 1948-49 ANTARCTIC WHALING EXPEDITION.

this season, amounted to 931,008 barrels (155,168 metric tons) of whale oil and 113,755 barrels (18,959 tons) of sperm oil, compared with 939,827 barrels (156,638 tons) of whale oil and 55,288 barrels (9,215 tons) of sperm oil last season when only nine Norwegian expeditions operated. (See Commercial Fisheries Review, July 1949, p. 52) Average production this season is 93.2 barrels per whalecatcher per day, compared with 97.7 barrels last season, according to an April 21 report from the American Embassy at Oslo.

Results of the 1948-49 season were only on a par with those of prewar despite the addition of one more expedition and the use of more modern equipment.



Poland

FISHING INDUSTRY, 1948: A steady development in the Polish fishing industry was attained during the postwar years (including 1948) in the number of fishing boats, the employment of fishermen, and the signing of export agreements with foreign countries which did not exist before the war, according to a March 18 report from the American Consulate at Gdansk.

Fishing Fleet, Ports, and Fishermen: Most of the fishing industry in 1947 was centered in Gdynia, but in 1948, an effort was made to shift the greater part of the fishing industry to the district of Szczecin, and to smaller ports (Leba, Darłowo, Władysławowo, Ustka, and Kołobrzeg) on the western part of the Polish coastline.

Polish Fishing Fleet and Fishermen, 1939, 1947, 1948					
Year	Fishermen	FISHING BOATS			
		Cutters	Motorboats	Sailing Cutters	Total Fishing Boats
	No.	No.	No.	No.	No.
1948	4,451	344	444	1,529	2,317
1947	3,704	246	350	1,426	2,022
1939	1,822	*	*	*	160
1938	1,955	*	*	*	*

*Not available.

the Baltic Sea, an increase of 4,804 tons over 1947. However, the plans for 1948 to reach a total of 42,000 tons of fish were only carried out by 91.2 percent. This was due to smaller catches in the second half of the year, and to bad weather conditions during that period. From January through May 1948, one boat caught an average amount of 21-26 metric tons of fish, whereas in November of the same year, the average of one boat reached only 5 tons. Accordingly, the first 5 months of the year yielded 66 percent of the total catches. In addition, 10,000 tons were produced on the high seas.

In general, 80 percent to 90 percent of the total catches are composed of cod. The balance consisted of eel, pike, and sander.

Exports: Before the war, the total catches of fish in Poland only amounted to a yearly average of 6,250 metric tons. This amount of fish was not even sufficient to supply the home market, and therefore a large amount had to be imported. This situation changed in the postwar years, however, so that by 1946 a certain amount of fish could be exported, mainly to Germany and Czechoslovakia. In March 1948, the Fish Central (Centrala Rybna) signed a contract to export 10,000 tons of cod to Germany (Russian Zone), and in August of the same year, another contract for 20,000 tons was signed with the same country. The export of fish

Production: In 1948, a total of 38,174 metric tons of fish was caught in

to Czechoslovakia and the export of salmon to England have also animated the Polish fish market and the canning industry which, until then, had not been of great importance.

Imports: Aside from the total amount of fish caught in 1948, another 27,355 metric tons were imported from Baltic countries in exchange for Polish coal, less than the 33,400 tons of fish imported in 1947

Plans for Expansion in 1949: It is planned to add 23 cutters (42.6 to 55.8 feet in length).

All cutters will be equipped with modern motors and modern navigational and fishing equipment. Apart from these cutters, another 8 cutters (43 feet in length) and 5 cutters (49 feet) are under construction, but will not be completed before 1950.

Before the war, Poland had only one refrigerated warehouse with a total space of 8,866 square feet, which was located in Gdynia. The major portion was used for the storage of fish, and the rest for the storage of ice. Aside from that, another small cold-storage plant with a freezing capacity of 1,200 metric tons of fish a year has been utilized. At the present time, a new refrigeration plant of a total space of 13,776 square feet is under construction, with a capacity for freezing 100 metric tons of fish every 24 hours which, according to the plans, will be completed in the first months of 1950. This plant also will contain a section for fish filleting.

Also, the construction of an ice plant is planned to be completed in 1950, capable of producing 150 to 170 metric tons of ice daily. Furthermore, a fish hall for the weighing, packing, and distributing of fish is under construction. It has been decided to replace the existing small factory for fish meal and fish oil by a larger one, with a capacity for handling 150 to 170 tons of raw material a day.

At Gdansk it is planned to build a fish refrigeration plant of 3,280 square feet as well as an ice factory, which will produce 15 metric tons of ice daily. Both will be completed in 1950.

In addition, several smaller fishing ports on the western Polish coastline are building cold storage, freezing, and ice plants together with other improvements and additions.

Economical and Social Sectors: In the Polish fishing industry, a great part of the turnover of fish is handled by the so-called social sector which comprises Government cooperatives and nationalized firms; a smaller part by the general sector, which comprises individual fishermen, supplied with Government cutters or their own equipment; and by the capitalistic sector which comprises private cooperatives.

Government Aid to Fisheries: In order to still augment the fishing industry, and secure the efficient participation of the fishermen, several arrangements have been made to provide more favorable living conditions for them. The entire coastline has been released for fishing settlements. Fishermen are allowed a certain amount of land and they can keep one cow and two hogs, to secure their living during bad fishing periods. No larger assignments will be made in order to prevent fishermen from becoming farmers. Also, credits are given for repair works, or new equipment, and fishermen are granted reduced income taxes.

There are some 150 Dutch fishermen under contract to the Polish Government, who are engaged in teaching modern methods of high-sea fishing to the Polish fishermen. They are stationed for the most part at Gdynia with smaller groups at the small fishing ports scattered along the Polish coast.



Portugal

DATA ON SARDINE PACKING: Oils Utilized: All Portuguese canned sardines are packed either in olive oil or peanut oil, according to a May 20 consular report from Lisbon. The percentage packed in one or the other oil varies, with the portion packed in olive oil being greater in the years in which the production of olive oil is more abundant and less in other years. At the present time, the percentage packed in each one of these oils may be calculated at about 50 percent.

Classification According to Type: The normal production of the canneries may be calculated more or less as follows:

Plain	-	85	percent	of	total	pack
Boneless and skinless	-	13	"	"	"	"
Boneless	-	2	"	"	"	"

Almost the entire pack of boneless and boneless and skinless is destined for the United States market.

Classification According to Size of Containers: The distribution of the pack according to the sizes of the containers used is approximately as follows:

	<u>% of Total Pack</u>
$\frac{1}{4}$ Club, 30 mm. ($4\frac{1}{2}$ oz.)	75
$\frac{1}{4}$ Club, 22 mm. ($3\frac{3}{4}$ oz.)	15
$\frac{1}{4}$ American, 30 mm (7 oz.)	3
Various sizes	7

* * * * *

MOTHER-OF-PEARL SHELLS AND BUTTON INDUSTRY: Production: Production in Portugal of buttons and related articles manufactured from mother-of-pearl shells totaled 219,000 gross in 1947 compared to 224,000 gross in 1946, according to a March 25 report from the American Consulate at Oporto.

Imports: During 1947 imports of shells totaled 709,320 pounds. The United States supplied 683,890 pounds, Venezuela 21,635 pounds, and other countries 3,795 pounds.

Current Requirements: According to the trade, Portuguese current requirements for mother-of-pearl shells are between 250 and 300 metric tons per year, about 93 percent of which are required from the United States. The trade further reports that they are paying between \$120-\$165 per metric ton f.o.b. for mother-of-pearl shells and that freight and other charges from American ports to Portugal reaches about \$50 a ton.

Exports: Certain quantities of the button production are sent to the Portuguese colonies, and the balance distributed to the market in Portugal.

Outlook: Manufacturers of mother-of-pearl buttons report that much depends on their ability in the future to obtain the required official permission from the Portuguese government to import mother-of-pearl shells in quantities sufficient to keep their plants in production.



Union of South Africa

WHALING PRODUCTION, 1948-49: Only two South African firms are engaged in whaling, according to an April 13 American consular report from Capetown. One company operates South Africa's factory ship, the Empire Victory, the largest factory ship among the antarctic expeditions, together with 25 catchers and a floating workshop. This firm also operates two land stations at Durban which process chiefly sperm, fin, and humpback whales. Extensions have been made to existing workshops and the hydrogenation plant there is now in full production.

The other company has a whaling station, six whalers, plant, quarters and storage facilities at Saldanha Bay.

All whale oil and whale meat produced at the three shore stations is consumed within South Africa. All sperm oil



SHORE-WHALING STATION AT DONKERGAT, ONE OF TWO OPERATING IN THE UNION OF SOUTH AFRICA. THE SLIPWAY AND FLENSING STAGE ARE ON THE RIGHT, WITH THE BUILDING WHERE THE MEAT IS PROCESSED ON THE EXTREME RIGHT. THE BLUBBER IS BOILED DOWN IN THE CENTER BUILDING, AND THE OIL STORED IN TWO TANKS ON THE LEFT.

South African Whale Catch and Production of Whale Products, 1948-49 Season

Item	Antarctic Expedition	South African Shore Stations	Total
	No.	No.	No.
Whale catch:			
Baleen:			
Blue	686	*	*
Fin	1,371	*	*
Total Baleen ...	2,057	1,205	3,262
Sperm	529	810	1,339
Grand Total	2,586	2,015	4,601
Whale Products:	Long Ton	Long Ton	Long Ton
Whale oil	22,233	6,079	28,312
Sperm oil	4,567	3,554	8,121
Whale meat	3,477	8,332	11,809
Liver flakes	357	60	417
Whale bones	-	868	868
Total	30,634	18,893	49,527

*Data not available.

locally produced at the shore stations, except for an insignificant quantity used locally, is sold in the United Kingdom. On the other hand, all whale oil and whale meat caught by the South African antarctic expedition is sold to the British Ministry of Food.

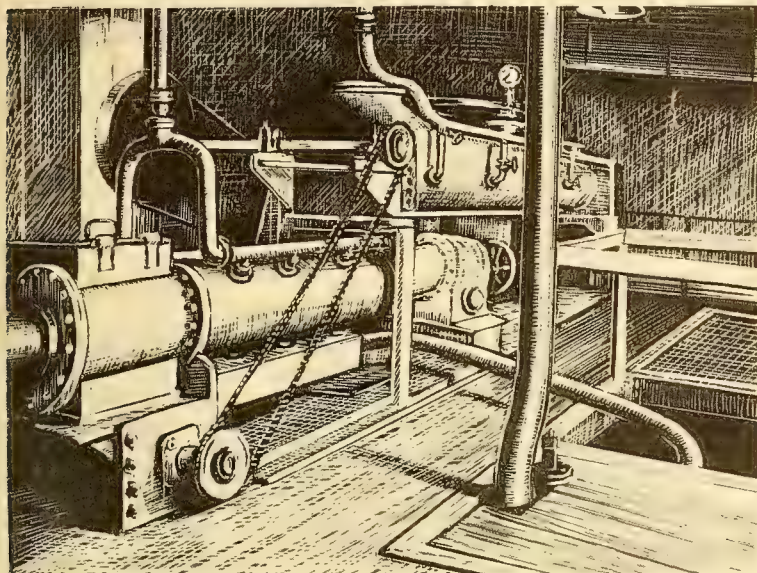
Prices: Under South African regulations all whale oils produced under the South African flag must be sold to the South African Government at \$340 per long ton. The Government then sold some of the whale oil locally at \$376 per long ton and at \$360 per

long ton to the British Ministry of Food (price contracted for at the beginning of the season).

United Kingdom

DEVELOPMENTS IN COD LIVER OIL MARKET: The British Ministry of Food revoked the Cod Liver Oil and Veterinary Oil (Control) Order on July 1, 1949, according to a July 13 report from the American Embassy at London. Licenses for the manufacture of these oils are no longer required.

The cod liver oil situation is reported to be particularly satisfactory, with local refiners providing the greater part of the country's needs for medicinal and industrial cod liver oil,



COMPACT LIVER OIL PLANT CAPABLE OF BEING INSTALLED ON BOARD A VESSEL. USED IN BRITISH COD LIVER OIL INDUSTRY.

and leaving a surplus for export. Certain grades of cod liver oil have been imported in small quantities from Norway and Newfoundland, although the import duty placed on this oil some years ago encouraged the local refiners to develop their business to a point that imports are greatly reduced as compared with prewar figures. Exports since the war have not yet reached their prewar volume, although the increased prices have accounted for a considerable increase in the value of exports. Exports, in 1948, totaled 3,438 metric tons (valued at \$2,402,521)

compared to 2,810 tons (valued at \$1,868,796) in 1947. Imports in 1948 amounted to 238 tons (valued at \$125,337) compared to 440 tons (valued at \$235,723) in 1947.

Cod liver oil refiners are established in Hull and Grimsby, the two ports at which the major part of the fish catch is landed. No figures of output are available, although it is indicated that some 56,000,000 pounds of fish livers are available from the total annual landings.

* * * * *

PRODUCTION OF HERRING OIL, 1948: The British Herring Industry Board states that herring oil production in the prewar period, 1934-38, probably did not amount to more than 100 to 200 long tons annually at the most, according to a May 24 report from the American Embassy at London. In 1947, the production amounted to about 650 long tons; and in 1948, to 1,000 tons. The available plant facilities would be able to produce some 3,000 long tons in 1949 providing that herring were caught in sufficient quantities.

The chief uses of herring oil are in margarine and fish canning, for the first grade product, and in industrial uses (i.e. leather dressing, candle making, paint, and linoleum manufacture) for the lower grades.

The Board has a long-term plan for the development of the industry and has a target of processing 175,000 long tons of herring a year and producing 20,000 long tons of edible oil and about 35,000 long tons of protein feeds.

U.S.S.R.

PRODUCTION OF FISHERY PRODUCTS: The U. S. S. R. has not published fishery products statistics for a number of years. However, the 1948 catch is estimated at 1,445,000 metric tons, the 1949 catch at 1,791,000 tons, while the plan for 1950 calls for a catch of 2,050,000 tons. These estimates are based on the announced five-year plan and adjusted by data as published in the Soviet newspapers from time to time. The latest published statistics available are for 1934.

U.S.S.R. Production of Fishery Products, by Species and Area, 1934										
Area	Sea and Coastal Waters							Total Sea & Coastal	Inland Waters	Total
	Caspian	Black-Azov	Northern	Ob	Far Eastern	Aral	Balkhash			
Species	(In thousands of metric tons)									
Fish:										
Herring	62.9	5.3	114.7	-	132.2	-	-	315.1	2.7	317.8
Vobla (Caspian roach)	204.8	11.8	-	-	-	3.4	-	220.0	1.5	221.5
Large chashtik ¹ /	157.8	60.9	14.0	4.9	16.3	19.7	10.0	283.6	45.1	328.7
Small chashtik ² /	47.9	48.8	18.8	5.6	8.2	3.2	3.2	135.7	63.3	199.0
Cod	-	-	93.5	-	9.2	-	-	102.7	-	102.7
Salmon	1.1	-	3.8	7.0	128.5	-	-	140.4	.4	140.8
Sturgeon	15.1	4.5	-	1.4	.2	.2	-	21.4	2.0	23.4
Flounder	-	.7	2.1	-	10.8	-	-	13.6	-	13.6
Carp	-	-	-	-	-	-	-	-	1.6	1.6
Tulka ³ /	-	-	-	-	-	-	-	-	3.4	3.4
Other misc. fish	5.4	130.7	16.2	-	5.7	-	-	158.0	3.0	161.0
Total fish	495.0	262.7	263.1	18.9	311.1	26.5	13.2	1,390.5	123.0	1,513.5
Crabs	-	-	-	-	12.6	-	-	12.6	-	12.6
Grand Total	495.0	262.7	263.1	18.9	323.7	26.5	13.2	1,403.1	123.0	1,526.1
1/Pike, pike-perch, bream, mackerel, grey mullet, ling, barbel, eel, bass, etc.										
2/Goby, smelt, tench, perch, crucian, gudge, ruff, etc.										
3/Clupea delicatula s. cultriventris.										

It is reported that the Russians are now working the rich fishing grounds, formerly fished by the Japanese, in the Northern Pacific (Karafuto, Kurile Islands, Bokbalin Island, Kamchatka and the Siberian coast north and west of the Sea of Okhotsk), but are handicapped by lack of man power, boats, and supplies. The bulk of the catch from this great region is salmon and king crab (most of which is canned), and these would probably account for the increase in total catch, as the other regions seem to be producing about the same as in former years or somewhat less.



Uruguay

PLANS FISHERIES EXPANSION: Two Danish fishery cutters (44 and 34 gross registered metric tons) departed from their home port of Thyborøn, Jutland, on April 12, 1949, bound for Montevideo, Uruguay, according to a May 19 consular report from Copenhagen.

These ships were built in Denmark, one in 1946, the other 1948. They carry complete and modern fishing equipment and are manned by Danish crews, all expert fishermen. It is understood that the crews will remain with the ships to perform fishing operations out of Montevideo for two years. The crews will also assist in training local fishermen. It is reported that this entire program is covered by contract between Danish and Uruguayan private interests with the sanction of the respective governments.

On the Danish side, the hope is expressed that the expedition will result in the opening of new markets in Uruguay for Danish fishery equipment, refrigeration machinery, and other supplies.



Venezuela

FISH CANNING INDUSTRY, 1948: The Venezuelan production of canned fish in 1948 increased 1,799 metric tons compared to 1947, according to a June 2 report from the American Embassy at Caracas.

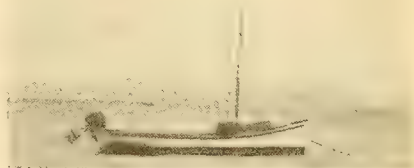
Venezuelan Production of Canned Fish, 1943-48						
	1948	1947	1946	1945	1944	1943
	(Metric Tons)					
Canned fish ...	9,278	7,479	7,742	6,023	4,198	2,000

The increase in 1948 was due to the construction of additional canneries. Most of the increased production was absorbed by the domestic trade.

* * * * *

SPINY LOBSTER CLOSED SEASON LENGTHENED: The Venezuelan Ministry of Agriculture issued a resolution published in Gaceta Oficial 22904, dated April 28, 1949, which prohibits fishing spiny lobsters (Palinurus argus) for the period June 1 to August 31, according to a May 12 report from the American Embassy at Caracas. The resolution also prohibits the transportation, sale, and possession at any time of lobsters which measure less than 8 centimeters from the point between the eyes to the end of the carapace, or of berried lobsters.

The current resolution differs from the previous resolution, which was repealed, by extending the closed season 15 days.



TYPICAL VENEZUELAN FISHING BOAT.



THE SHRIMP AND THE SHRIMP INDUSTRY OF THE SOUTH ATLANTIC AND GULF OF MEXICO

The shrimp fishery of the United States is centered primarily in the eight South Atlantic and Gulf States where almost 200 million pounds are taken annually. The shrimp ranks first in value among all the fisheries of the South and usually rates as the sixth most valuable fishery of the United States, including Alaska. There are three species of shrimp, all members of one family (Penaeidae) which are of commercial importance in this area. The common shrimp (Penaeus setiferus) yields at least 95 percent of the total catch whereas the grooved shrimp (Penaeus brasiliensis) and the sea bob (Xiphopenaeus kroyeri) produce the remainder.



Department of the Army

PROCUREMENT OF FISHERY PRODUCTS AND EXPORTS TO OCCUPIED AREAS: The great bulk of food purchases for civilian relief feeding in occupied areas are made by the Commodity Credit Corporation of the U. S. Department of Agriculture, according to a recent report from the Office of Food Administrator for Occupied Areas, Department of the Army. A few items are procured by the Quartermaster General of the Army, including fish, fish oils, and other fishery products.

Purchases of fishery products are made by the Quartermaster Purchasing Office, 111 East 16 Street, New York, N. Y. Offers of fishery products and requests for listing as permanent bidders should be submitted by U. S. suppliers to the above Quartermaster office.



Interstate Commerce Commission

RAILROAD FREIGHT RATES AND CHARGES FOR FISHERY PRODUCTS INCREASED: Permanent increases in freight rates and charges were granted American railroads in an August 2 Interstate Commerce Commission report and order, issued on August 11, 1949. These are in place of earlier temporary increases granted in I.C.C. Docket Ex Parte 168 and are the Commission's final conclusion as the result of proceedings under that Docket. Increases in rates and charges which apply to the fishery industries are as follows:

Basic railroad rates and charges may be increased as follows:

Within eastern territory	10%
Within southern territory	10%
Within Zone 1 of western trunk-line territory	9%
Within western territory other than Zone 1 of western trunk-line territory	8%
Interterritorially, between eastern territory and southern territory	10%
Interterritorially, other than between eastern and southern territory	9%

By basic freight rates and charges are meant those now in effect, or published to become effective but not yet effective, including the increases made effective under the authority granted in Ex Parte No. 162 and Ex Parte No. 166, and including rates held under investigation and suspension orders; also rates prescribed by Interstate Commerce Commission orders, when and as such rates become effective, subject to any exceptions specifically made in the orders. However, for the purpose of determining basic rates from such present freight rates and charges, there shall be excluded such portion thereof as represents all increases made pursuant to previous report and orders in this proceeding.

No limitations in the form of maximum increases on fishery commodities were made by the Commission. All fishery commodities take the increases as described above. No increases were allowed in rates and charges for protective services as published in Perishable Protective Tariff No. 14, Agent Quinn's ICC No. 25. Charges for certain miscellaneous services such as loading or unloading, diversion or reconsignment were authorized to be increased by the same amounts as described above.

The new rates and charges will become effective September 1, 1949. Although a 13 percent increase had been requested by the railroads, the Commission allowed an average total permanent increase of 9.1 percent which amounts to approximately \$2,500,000 less than what the railroads requested for the transportation of fishery products.



Department of State

INTERNATIONAL MEETING ON HERRING AND ALLIED SPECIES: The United States Delegation to the International Meeting on Herring and Allied Species to be convened at The Hague, Netherlands, August 29, 1949, by the Food and Agriculture Organization of the United Nations (FAO) was announced by the Department of State on August 16. The Delegation is as follows:

Chairman

Mr. A. W. Anderson, Chief, Branch of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

Delegates

Mr. Maurice Wallar, Acting Chief, Dairy, Poultry, Fish, Livestock and Meat Section, Food Branch, Office of International Trade, Department of Commerce

Mr. Charles Carry, Director, Fishery Products Division, National Cannery Association

Advisers

Mr. R. W. Tyson, Chief, Special Commodities Branch, Food and Agriculture Division, Economic Cooperation Administration

Mr. R. H. Fiedler, Fisheries Specialist, Food and Agriculture Division, Economic Cooperation Administration

Mr. Lloyd Steere, Counsellor of Embassy for Economic Affairs, American Embassy, The Hague

Mr. Francis Linville, Division of International Resources, Department of State

The agenda for the meeting will include such subjects as: production; processing; marketing and distribution; and prices. The Herring Commodity Study compiled by the FAO will also be discussed.

Herring fisheries are as old as the settlements of northwestern Europe and have played an important role in its history. In the period between the 12th and 17th centuries, wool and herring were the "key" industries in this area. The

economic history of England was considerably influenced by the herring industry and Holland's first merchant marine and navy was composed of ships from the fleets that were in the habit of sailing the North Sea in search of herring. For many years herring fisheries were essential in the economy of all Scandinavian countries.

During the late 1930s, Japan, the United States, and Canada together accounted for more than 50 percent of the world's total landings of herring and allied species, despite the traditional importance of European fisheries. With the termination of Japan's activity in the herring industry as a result of World War II, the United States has become the largest producer of herring and herring-like fishes in the world and has a substantial interest, therefore, in keeping abreast of all developments affecting production and marketing.



CANNED CRAB INDUSTRY OF JAPAN

Japanese factory ships began crab-canning operations in Alaskan waters in 1932, when the 3,823-ton Nagato Maru first went into the eastern part of the Bering Sea. Operations in these waters were maintained yearly thereafter through 1940.

During 1932-40, 16,237,980 crabs were caught, yielding a pack of 291,607 cases. This Alaskan pack was approximately 3.4 percent of the total Japanese crab meat production.

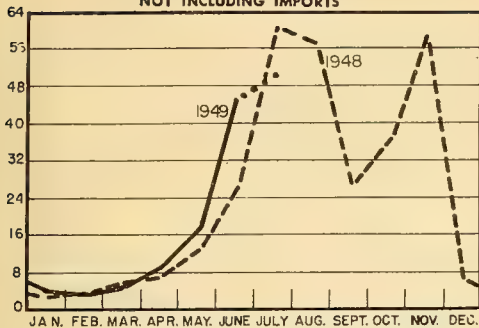
From 1933-37, trawlers accompanied the factory ships into both the Okhotsk and Bering Seas, using the mothership's facilities for the manufacture of fish meal, mostly from herring.

While the area of operations varied somewhat from year to year, it centered in a rectangle bounded approximately by Latitudes 55° N. to 60° N. and Longitudes 160° W. to 170° W. This is the Bering Sea area extending from the Aleutian Island group known as the Islands of the Four Mountains to half way up the coast of the Alaska Peninsula. Some fishing was done as far north at Latitude 62° N. and Longitude 163° W., the Bristol Bay area of the Alaskan coast. The best grounds proved to be the open sea off Amak Island, Port Moller, and Bristol Bay. However, the fishing grounds in the Alaskan area were unprofitable for mass floating factory activities because the crab population was not sufficient to support large-scale operations, as compared with the greater abundance along the western coast of the Kamchatka Peninsula. For this reason, only a single factory ship was sent into the Alaskan waters specifically for crabbing each year. Consequently, these waters were never greatly exploited.

—Fishery Leaflet 314

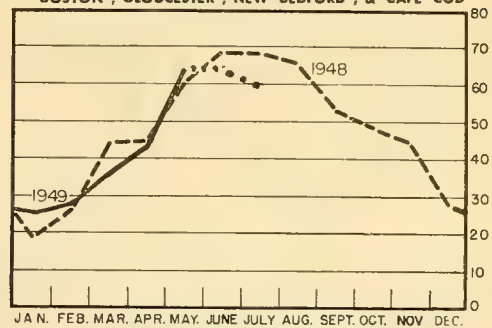
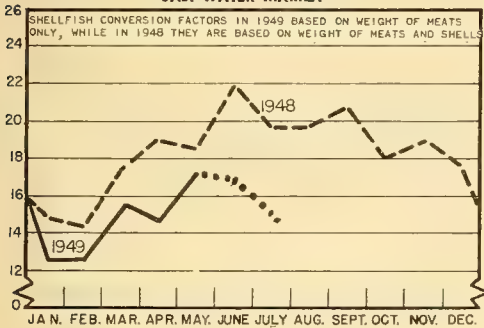
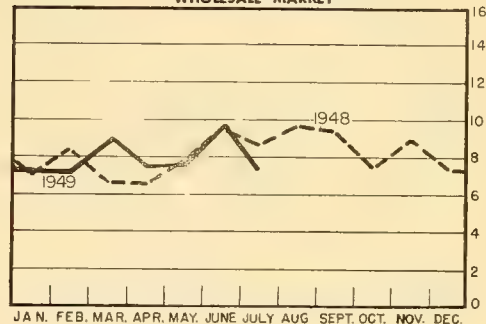
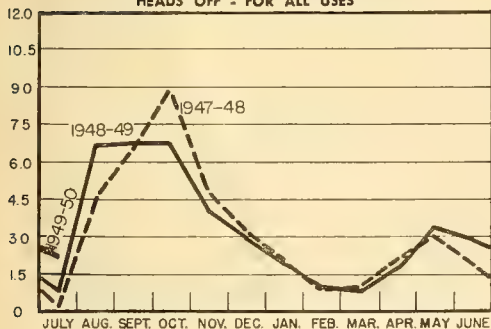
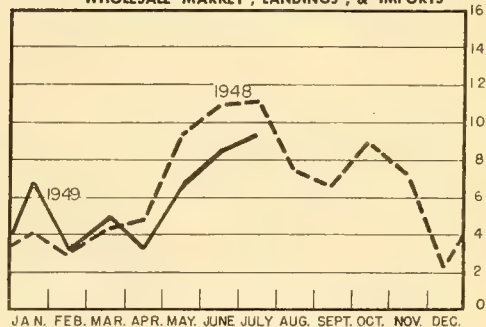
LANDINGS AND RECEIPTS

In Millions of Pounds

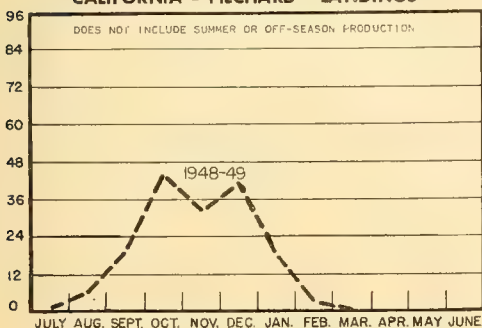
MAINE - LANDINGS
NOT INCLUDING IMPORTS

MASSACHUSETTS - LANDINGS

BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE COD

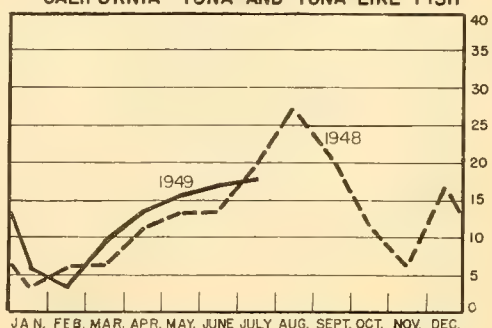
NEW YORK CITY - RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKETCHICAGO - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKETGULF - SHRIMP LANDINGS
HEADS OFF - FOR ALL USESSEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET, LANDINGS, & IMPORTS

CALIFORNIA - PILCHARD LANDINGS



In Thousands of Tons

CALIFORNIA - TUNA AND TUNA-LIKE FISH

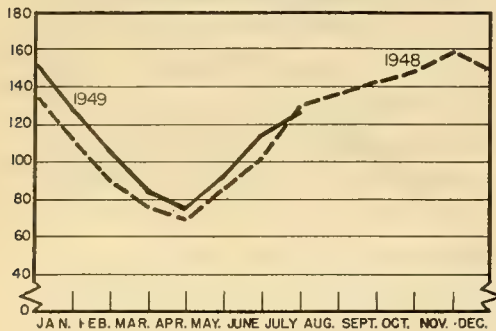


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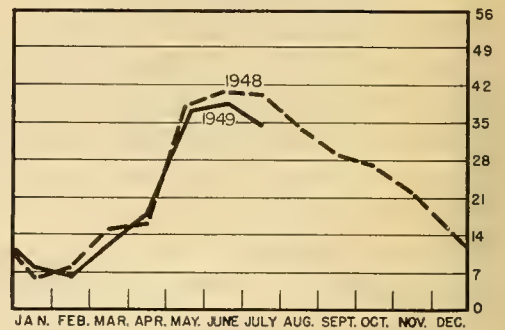
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

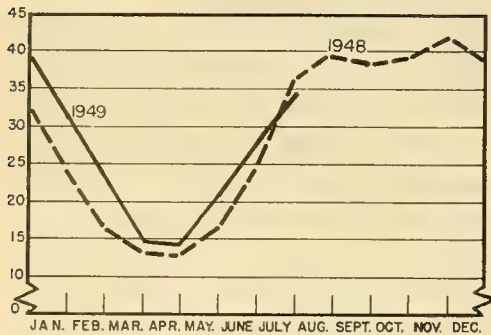
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



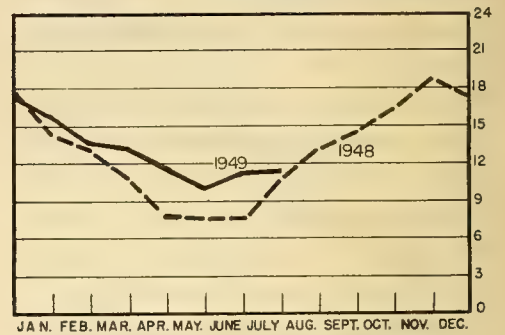
U.S. & ALASKA - FREEZINGS



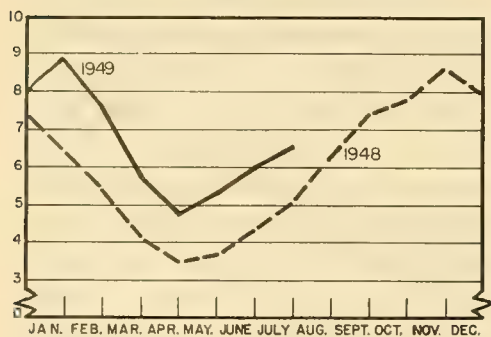
NEW ENGLAND - HOLDINGS OF FROZEN FISH



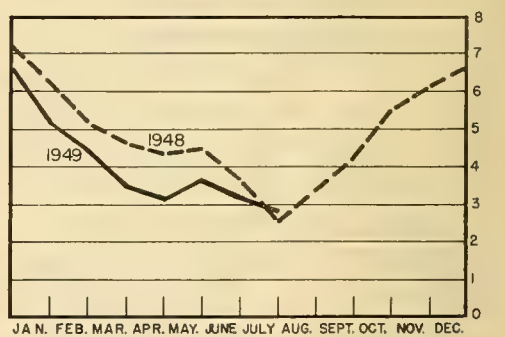
NEW YORK CITY - HOLDINGS OF FROZEN FISH



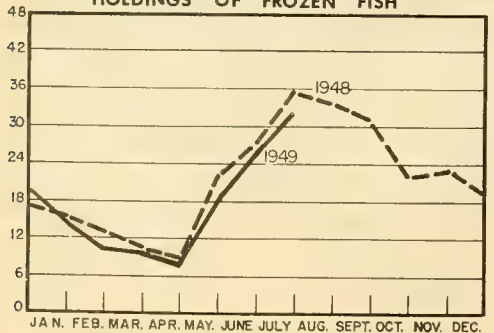
CHICAGO - HOLDINGS OF FROZEN FISH



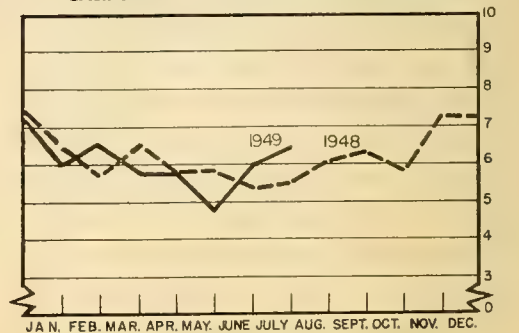
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



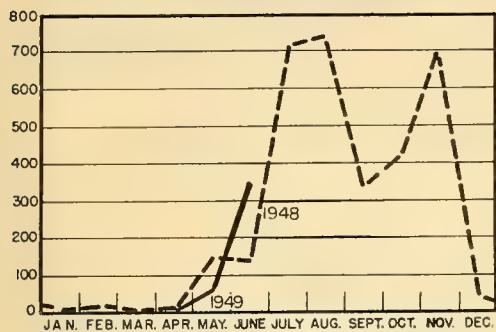
CALIFORNIA - HOLDINGS OF FROZEN FISH



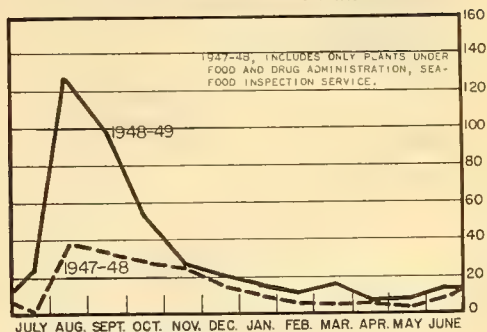
CANNED FISHERY PRODUCTS

In Thousands of Standard Cases

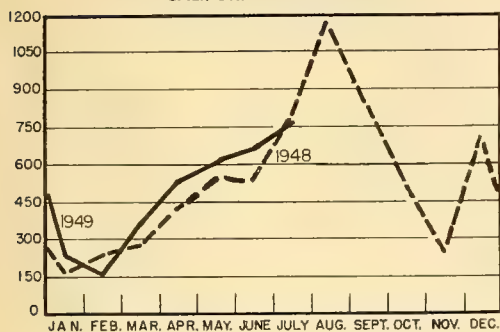
MAINE - SARDINES, ESTIMATED PACK



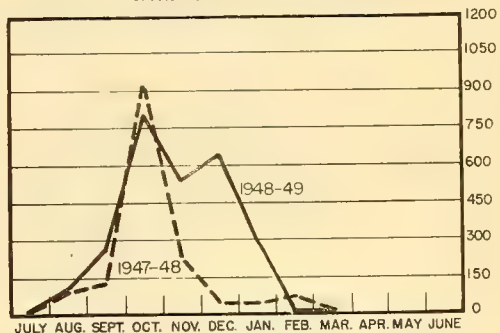
UNITED STATES - SHRIMP



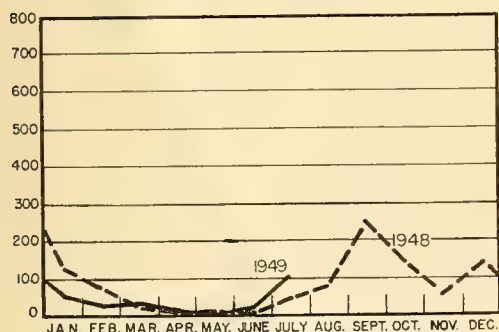
CALIFORNIA - TUNA



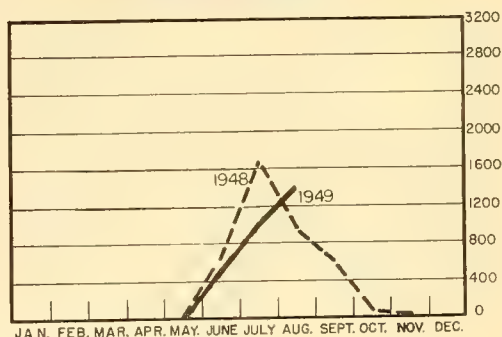
CALIFORNIA - PILCHARDS



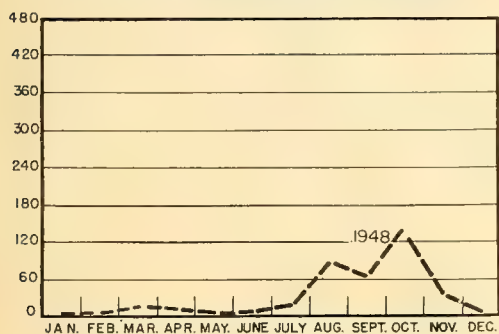
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON

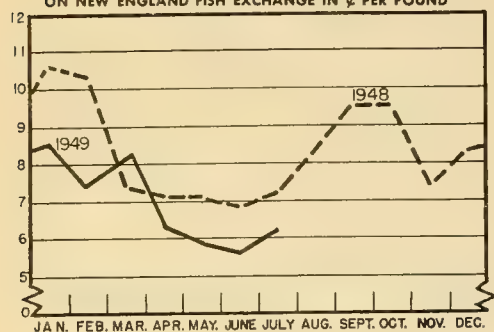


STANDARD CASES

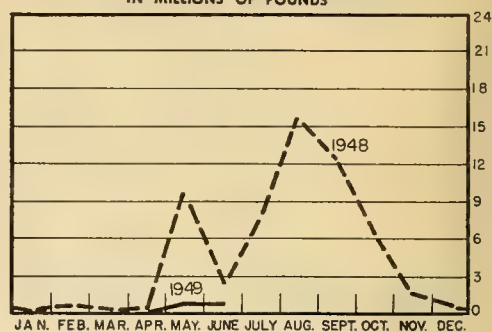
Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	No.1 picnic	7 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

PRICES, IMPORTS and BY-PRODUCTS

BOSTON - WEIGHTED AVERAGE PRICE
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND

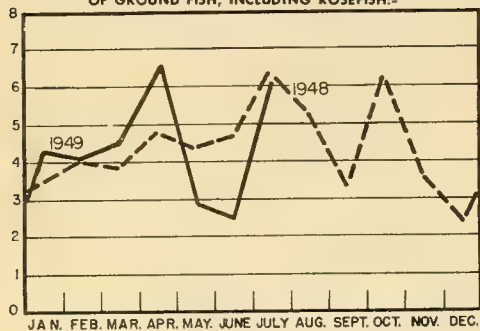


MAINE - IMPORTS OF FRESH SEA HERRING
IN MILLIONS OF POUNDS



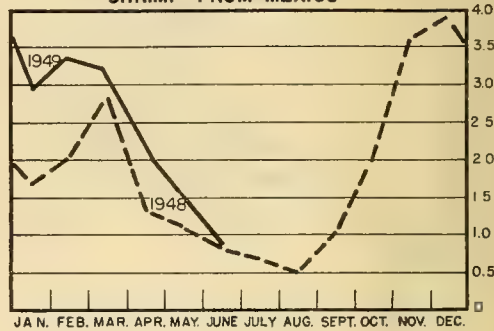
In Millions of Pounds

U.S. - IMPORTS OF FRESH & FROZEN FILLETS
OF GROUND FISH, INCLUDING ROSEFISH:-

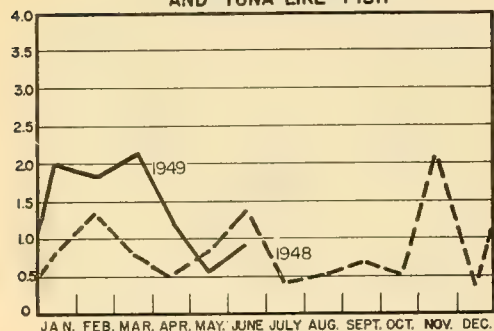


IN MILLIONS OF POUNDS

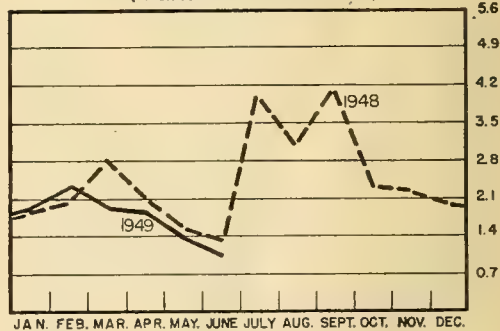
U.S. - IMPORTS OF FRESH AND FROZEN
SHRIMP FROM MEXICO



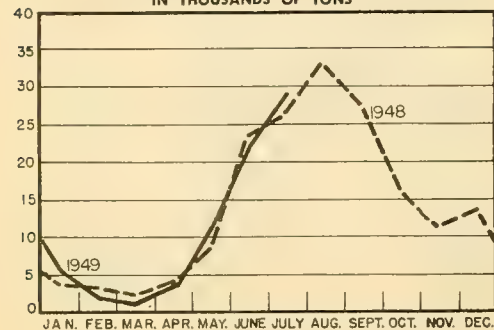
U.S. - IMPORTS OF CANNED TUNA
AND TUNA-LIKE FISH



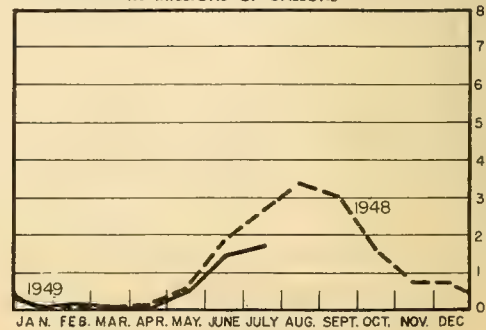
U.S. - IMPORTS OF CANNED SARDINES
(Include in oil and not in oil)

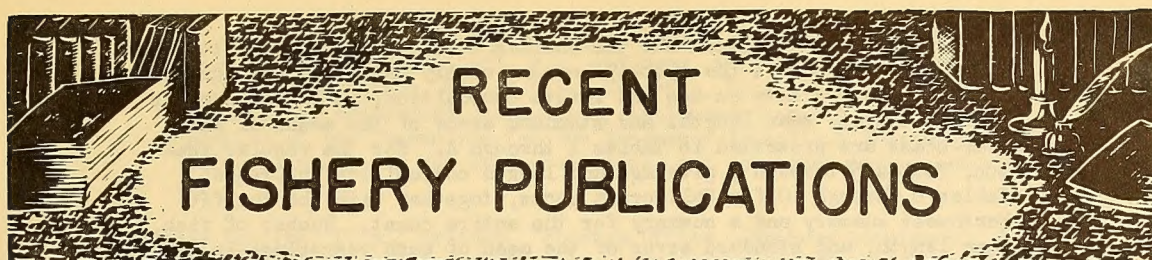


U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS



U.S. & ALASKA - PRODUCTION OF FISH OIL
IN MILLIONS OF GALLONS





Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
 FL - FISHERY LEAFLETS.
 MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
 SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
 SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-484	- Maine Landings, by counties, 1948 Annual Summary
CFS-485	- Maine Landings, May 1949
CFS-486	- Fish Meal and Oil, June 1949
CFS-487	- Fisheries of the United States and Alaska, 1946 Annual Summary
CFS-488	- Pacific Coast Fisheries, 1947 Annual Summary
CFS-489	- Frozen Fish Report, Preliminary, August 1949
CFS-489	- Frozen Fish Report, August 1949, Final
CFS-491	- Maine Landings, June 1949
FL-343	- Floating Trawls
FL-345	- Whale and Fish Oils (Iceland)
FL-347	- Growth of South African Fisheries
FL-348	- German Commercial Electrical Fishing Device
FL-349	- Fishing and Fisheries (Brazil)
SL-107 (Revised)	- Firms Canning Miscellaneous Fish and Fish Products, 1948
SL-109 (Revised)	- Firms Canning Caviar and Fish Roe, 1948
SL-115 (Revised)	- Firms Canning Miscellaneous Shellfish and Turtle Products, 1948
SL-116 (Revised)	- Firms Canning Food for Animals from Fishery Products, 1948
SL-119 (Revised)	- Firms Canning Squid, 1948
SL-120 (Revised)	- Firms Canning Anchovies, 1948
SL-155 (Revised)	- Firms Manufacturing Marine Pearl-Shell Buttons, 1948
Sep. 235	- Japanese Methods of Oyster Culture
Sep. 236	- Use of Pyrex Test and Culture Tubes as Solution Cells with Pfaltz and Bauer Photoelectric Fluorophotometer

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

"Age and Length Composition of the Sardine Catch off the Pacific Coast of the United States and Canada in 1948-49," by Frances E. Felin, Julius B. Phillips, and Anita E. Daugherty, article, California Fish and Game, July 1949, vol. 35, no. 3, pp. 165-183, printed, free. Division of Fish and Game, Department of Natural Resources, San Francisco, Calif. This is a third report on age and length composition of the sardine

(*Sardinops caerulea*) catch off the Pacific Coast of the United States and Canada and covers the 1948-49 season (mostly tables). For inter-season fisheries, data on age and length composition, estimated numbers of fish caught, mean lengths and standard error of the means of each year-class are presented in Tables 1 through 4. For the regular season, Tables 5 through 7 give age and length composition in Oregon; Tables 8 through 10 for California ports, together with the Pacific Northwest summary and a summary for the entire coast. Number of fish, mean length, and standard error of the mean of each year-class in the samples for 1948-49 by region of catch are given in Table 11. Calendar dates for lunar months in the 1948 interseason and 1948-49 season are given in Table 12. Age composition of the catch in terms of numbers of fish caught in the Pacific Northwest and in California appear in Table 13.

Aid to States in Fish Restoration and Management Projects, Senate Report No. 891 (to accompany H. R. 1746), August 11, 1949, 2p., printed. Senate Committee on Interstate and Foreign Commerce, Eighty-First Congress, First Session. A favorable report by the Committee on H. R. 1746, to provide that the United States shall aid the States in fish restoration and management projects, and for other purposes.

Biographies of Florida's Important Food Fish and Their Nutritive Value, 31 p., illus., printed, free. Florida State Board of Conservation, Tallahassee, Fla. This publication presents Florida's more important food fish and a brief narrative of each one. The first part of the booklet discusses the nutritive value of fish and shellfish.

"Experiments in Catching Pelagic Fish and Invertebrates in the Seas of the Far East by Electric Light," by P. G. Borisov, article (in Russian) Rybnoe Khoziaistvo, No. 1, 1949, pp. 18-23. The method of catching fish by electric light described in this article consisted in illuminating the surface of the sea with a 1000-watt electric lamp suspended from the deck of the ship. When sufficient number of fish gathered in the illuminated area, all lights above the surface were turned off, while the underwater lamp of the same intensity, lowered to the desired depth, was turned on. A pyramid-shaped net, three meters high and .4 sq. meters at the base, was set below the underwater lamp. As soon as sufficient number of fish gathered above the opening, the net was hauled up. The catch in a single haul varied from 30 to 120 kilos (66 to 264 pounds). Lamps of various colors were used. The depth to which they were lowered varied from 1 to 80 meters. The bulbs could not stand greater depth and all burst below 80 meters. The following fishes were caught in fairly large quantities: Saira (*Cololabis saira*), Scomber (*Pneumatophorus japonicus*), anchovy (*Engraulis japonicus*), Koriushka (*Osmerus eperlanus dentex*), Ogurechnik (*Hypomerus olidus*), Kundja (*Salvelinus leucomaenis*), Krasnoperka (*Leuciscus crandti*), calmar (*Ommastrephes sloani pacificus*--a cephalopod) and shrimp (*Pandalus latirostris*).

- - Dr. P. S. Galtsoff

"General Aspects of the World's Tuna Fisheries," article, Fisheries Bulletin, July-August 1949, vol. II, no. 4, pp. 82-105, processed, 25 cents per issue. Food and Agriculture Organization, Washington, D. C. Some of the more important features of the world's tuna fisheries (including bonito) are briefly outlined in text and tabular form in this number of the Fisheries Bulletin. In view of the importance of these fisheries and the awakening interest now being shown in their expansion, this introductory outline should be of value to all those interested in tuna. Included are data on world landings of tuna, tuna-canning industries, the United States as the major market for canned tuna, tables on landings of tuna, and tables on tuna canning and marketing.

International Convention for the Northwest Atlantic Fisheries, Executive Rept. No. 10, July 25, 1949, 6 p. with map, printed. Senate Committee on Foreign Relations, Eighty-First Congress, First Session. Discusses the purpose, background, advantages, implementation and costs, and benefits of the Convention for the Northwest Atlantic Fisheries. Includes a summary of the main provisions, and committee action and hearing.

Japanese Whaling, 17 p., printed. Foreign Office, Japanese Government, January 1949. This monograph describes the importance of whaling to Japan as a source of meat, oil, and foreign exchange funds, and briefly summarizes the history of Japanese prewar and postwar whaling. The results of the 1946-47 and 1947-48 Antarctic whaling expeditions are set forth in detail. It concludes with an expression of Japan's willingness to adhere at any time to the International Whaling Convention and of Japan's hope that continuance of its Antarctic whaling operations will be approved by all nations concerned.

Miscellaneous Fish and Wildlife Bills (Hearings before the Subcommittee on the Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representative, Eighty-First Congress, First Session, on various bills, May 12, 13, and 24, 1949), 120 p., printed. Available only from the House Committee on Merchant Marine and Fisheries until exhausted. Includes hearings and statements on H. J. Res. 202 relating to investigation and eradication of predatory sea lampreys of the Great Lakes, and to amend the act of August 8, 1946; H. Res. 174 relating to the study of the effect of imports of fresh and frozen fish on the domestic fishing industry; H. R. 4249 and H. R. 4252 relating to the transfer of the trawlers Alaska and Oregon from the RFC to the Fish and Wildlife Service, H. R. 2501 relating to a continuing study of the shad of the Atlantic Coast by the Fish and Wildlife Service; and various other bills relating to the establishment of rearing ponds and fish hatcheries.

"Notes on the Spawning Grounds and Early Life History of the Pacific Mackerel," by Phil M. Roedel, article, California Fish and Game, July 1949, vol. 35, no. 3, pp. 147-153, illus, printed, free. Division of Fish and Game, Department of Natural Resources, San Francisco, Calif. For a number of years prior to 1942, the California Bureau of Marine Fisheries made a series of surveys along the California and Lower California coast in order to determine the extent of the spawning grounds of the Pacific mackerel (Pneumatophorus diego Ayres). In 1936, two papers were published (Fry 1936 a, b), the first describing the eggs and early larval stages and the second delineating the spawning grounds as they were then known. From 1936 through 1941, a considerable amount of additional data were obtained both as to spawning grounds and early life history. This article presents this material, together with a summary of Fry's findings, as an aid to other workers.



Processing -- Miscellaneous Service Division

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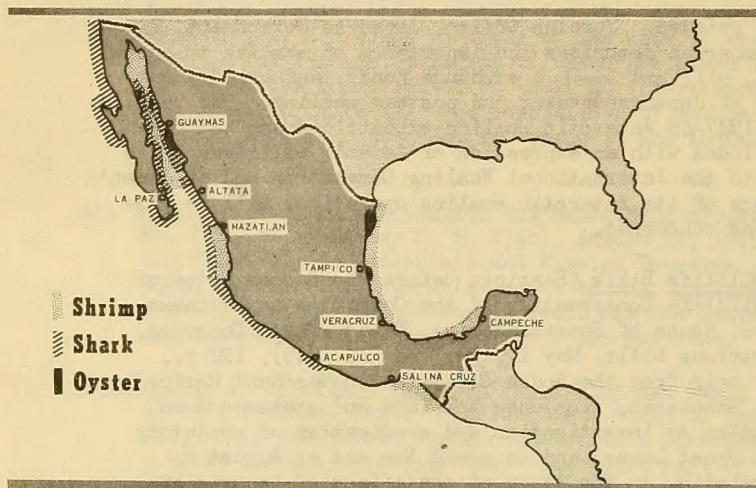


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THE MEXICAN FISHERIES INDUSTRY

Fishery Leaflet 339 is a 21-page leaflet containing information on Mexico's fishing ports and includes the ports of Guaymas and Ciudad del Carmen; location

INDUSTRY



of fisheries and includes tuna, shrimp, and shark fisheries; employment and fishing vessels; the fishing methods employed in the various fisheries; production of fishery products and byproducts and methods of processing; international and internal trade pattern; consumption; and an outlook report.

Copies of Fishery Leaflet 339 "The Mexican Fisheries Industry," may be obtained upon request, without charge, from the U. S. Fish and Wildlife Service, Washington 25, D. C.

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Robert H. Gibbs

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